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Module 6

ART 21

Building Our World

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Art 21

Module 6

BUILDING OUR WORLD

Distance Learning

Alberta
EDUCATION

Stonehenge, c 1800-1400 B.C.
Salisbury Plain, Wiltshire, England.
ART Resource, N.Y.

Art 21
Student Module
Module 6
Building Our World
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MODULE 6

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OVERVIEW

This module is an introduction to the power of public architecture to represent a society's values. Architecture is an important branch of art since buildings are the result not only of the technology of structures, but also of the artistry of creating spaces that express ideas and purposes.

To understand the meanings expressed by buildings you need to know something about some of the major structural systems and their symbolic use. To learn something about what a specific building or structure is, and about how and why it came into being, is to begin to understand what public architecture can tell you about the connection between enclosed spaces and a people's beliefs and values.

Temples, civic centres, churches, and government buildings can all tell you something about meaning in architecture. You will learn, not only to look at and describe a building, but also to inquire into the significance that building had for its time and place.

Module 6
Building Our World

- **Section 1**
  Structural Systems and Meanings
- **Section 2**
  Civic Centres and Public Values
- **Section 3**
  Romanesque Architecture
- **Section 4**
  The Gothic Cathedral and the Mysticism of Light

Module 6 is made of 4 interrelated sections.

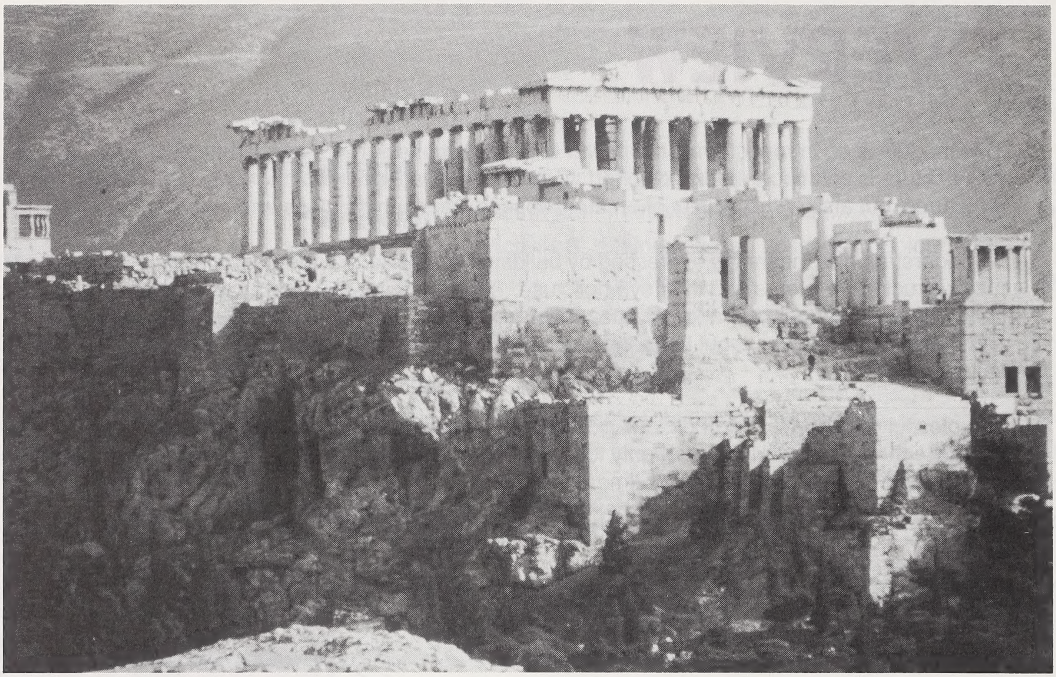


Illustration 210. The Acropolis, Ancient Greece. SCALA/ART Resource, N.Y. *Sightlines* 3976.

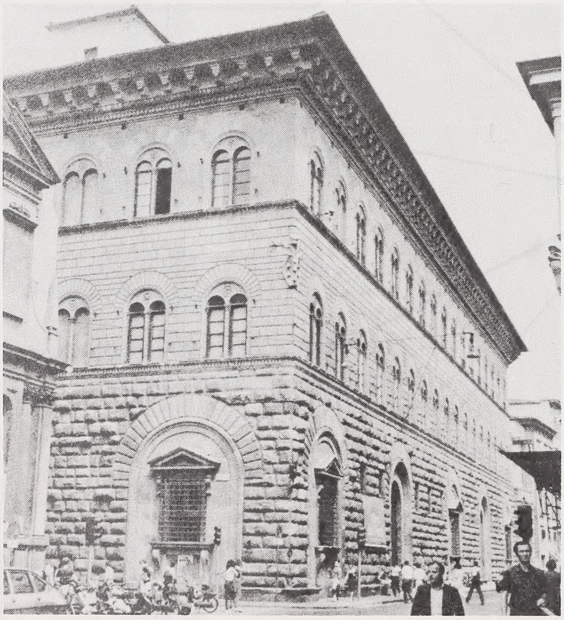


Illustration 211. Michelozzo. Palazzo Medici-Riccardi. Begun 1444, Florence, Italy. ART Resource, N.Y. *Sightlines* 3598.

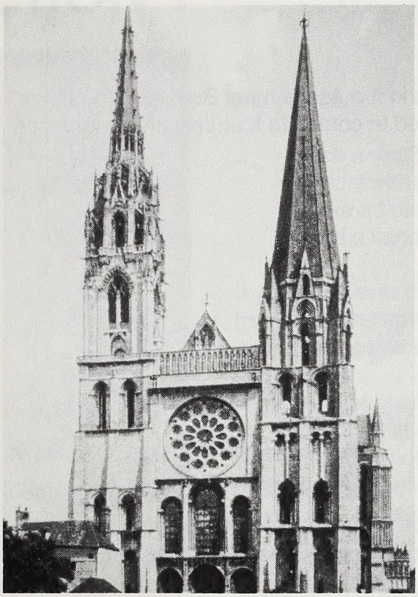


Illustration 212. Chartres Cathedral, 1194-1240. France. ART Resource, N.Y.

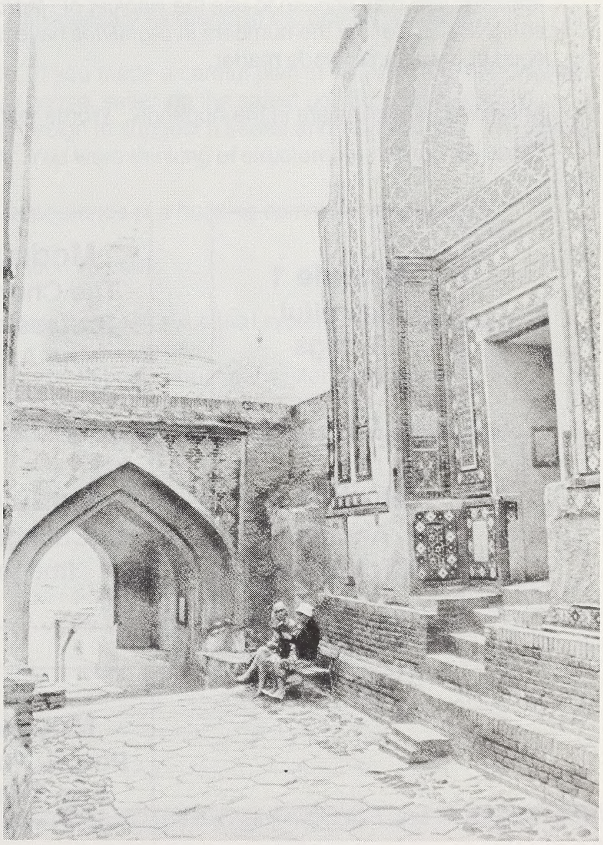


Illustration 213. Shah-I-Zinde, a complex of tombs in Samarkland. Islamic Monument. *Aramco World Magazine*, 1983.

Evaluation

Your mark in this module will be determined by your work in the Assignment Booklet. You must complete all assignments. In this module you are expected to complete four section assignments. The assignment breakdown is as follows:

Section 1	25%
Section 2	25%
Section 3	25%
Section 4	25%
Total	100%

Note: Some images for study are located in the module booklets; some you will have to locate in magazines or in your community; some are in the *Booklet of Reproductions.* When the ▤ symbol appears, you may choose to use the *Booklet of Reproductions* or the laserdisc, *Sightlines* (if available). Bar codes for the numbers in *Sightlines* have been included for use with laserdisc players equipped with a bar code reader.

Answers to activities are in the Appendix. Words marked * are defined in the Glossary in the Appendix.

Module 1
Beautiful Things

Module 2
The Changing Profession of the Artist

Module 3
Heroes and Heroines

Module 4
Ancient Civilization

Module 5
Changing Images

Module 6
Building Our World

Module 7
Power, Politics, and Change

SECTION 1

STRUCTURAL SYSTEMS AND MEANINGS

Did you ever

- pitch a tent?
- build a tree house?
- make a house of cards?
- build a sandcastle?

If you have ever done any of these things, then you will remember that you had to solve some special structural problems. If you pitched a tent, you had to erect a secure triangular frame to support the weight; if you built a tree house, you had to consider carefully the strength and characteristics of tree and branch; if you made a house of cards you had to solve the problem of balance in both vertical and horizontal directions; if you built a sandcastle, you had to know the ideal building condition of the material – sand not too wet, not too dry. The study of support systems, the consideration of environments, the analysis of vertical and horizontal balances and thrusts, and the knowledge of building materials are all necessary elements in the design of buildings.

Think of the tree house. If you made a careful plan in advance and supervised the building of your tree house, selecting the safest position, the strongest materials, and the best design to suggest a secret and private place, you were acting like an architect. You were thinking of structure and of appearance.

The structure and the appearance of a building communicate meaning.

After completing this section you will

- be familiar with some common structural systems used in building
- be able to relate some of these structural systems to meaning
- recognize and discuss a major architectural example of each basic system

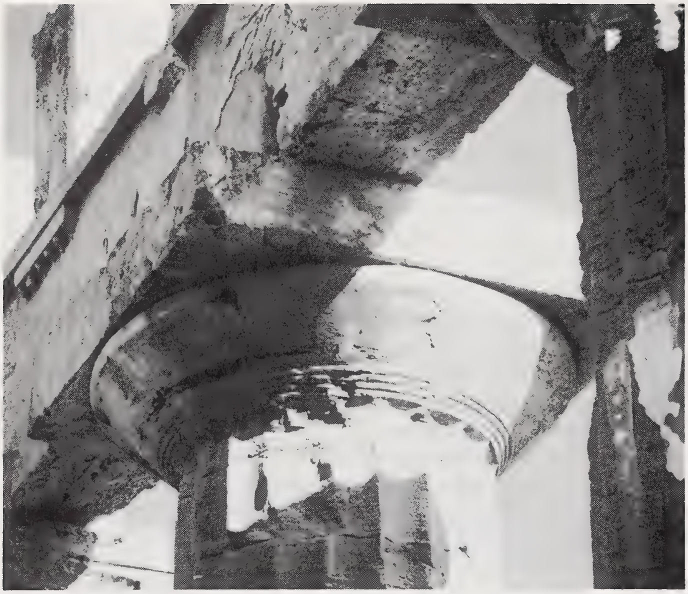
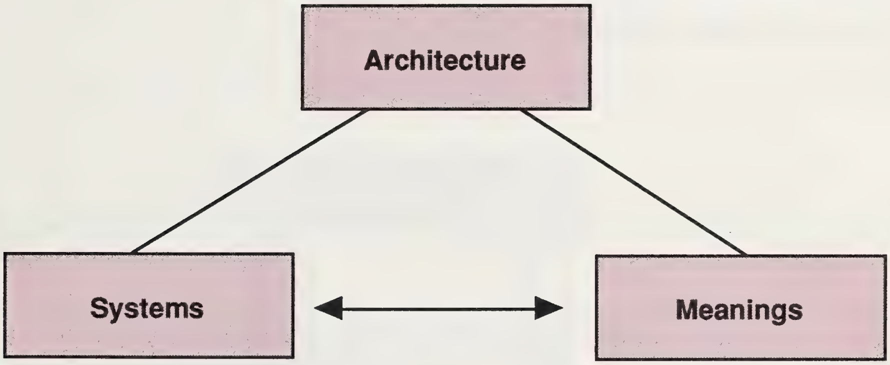


Illustration 214. Ancient Greece. Detail. Temple (Temple of Hera) – Selinus c 470 B.C. ART Resource, N.Y. *Sightlines* 3130.

Illustration 215. *Building Sandcastles*. Alberta Government Photo.

Whenever people come together to worship, to govern, to conduct business, to learn, they need an enclosed space that will both shelter them and allow them to perform and to enjoy significant rituals and community activities. Churches, schools, civic centres, stadia,* are all special purpose buildings designed to show function and meaning by their structure. Architecture is the science and the art of designing buildings and spaces that will be functional, beautiful, and significant.

The architect needs to know how to design a structure that won't fall down and at the same time to make that structure communicate special purposes and values.



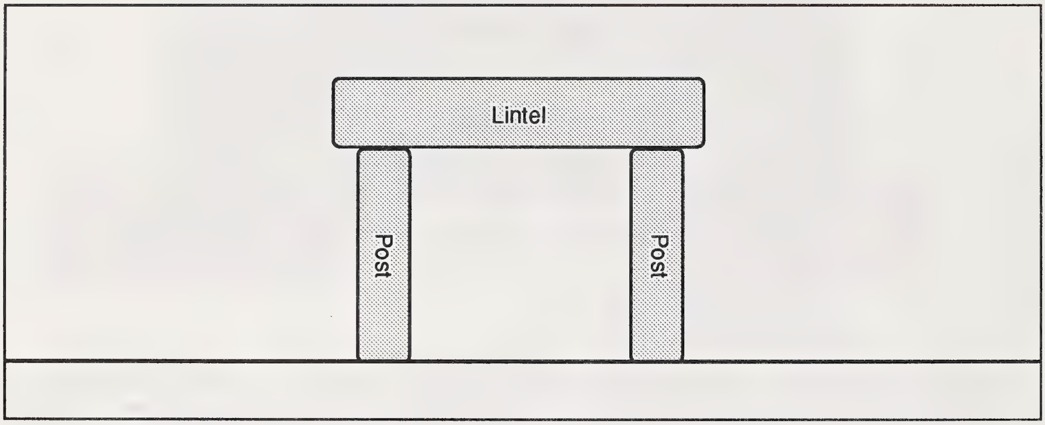
Everything that stands up needs a structure that will support weight. Your skeleton is a structure that is designed to hold you upright, and indeed, some structural systems are like skeletons. In this section you will learn something about the way some of the basic architectural weight-supporting systems work and how these systems are used to communicate meaning and to symbolize beliefs and values.

Activity 1: Post and Lintel

Become familiar with some common structural systems used in building.

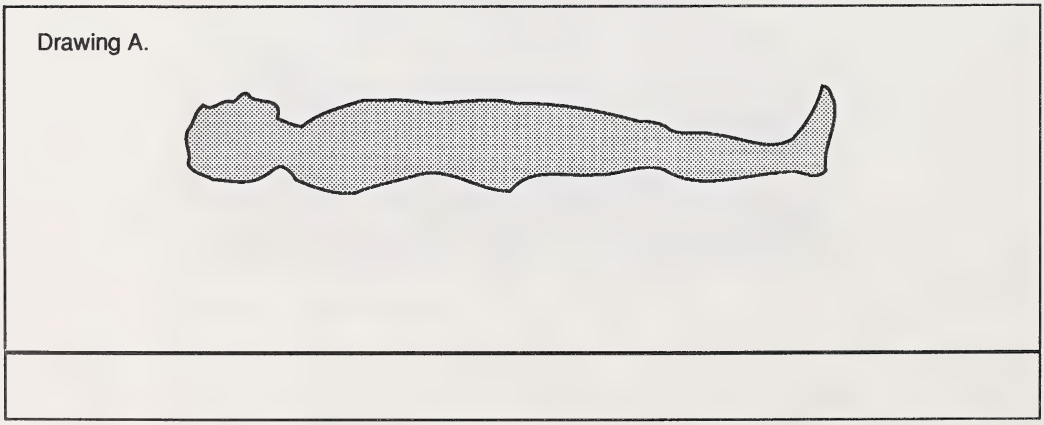
Post and lintel is an architecture of solidity.

1. Look at the drawing which follows:



This arrangement of two strong upright or vertical posts supporting one horizontal beam or lintel is called the **post and lintel** system. To get an idea of how this system works, imagine you are stretched out flat on the floor. Now holding yourself as rigidly as possible, ask three friends to lift you up. Using the diagram in Drawng A. sketch stick figures to represent "your friends."

Drawing A.



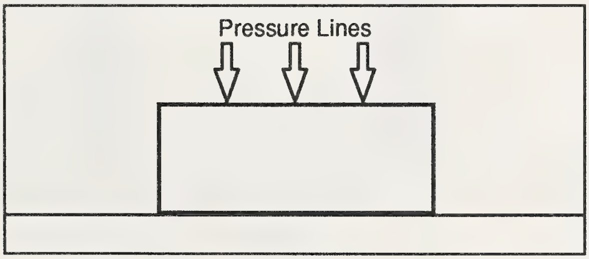
2. Now remove the middle figure, leaving one support at each end only. Draw the result. Use stick figures.

Drawing B.

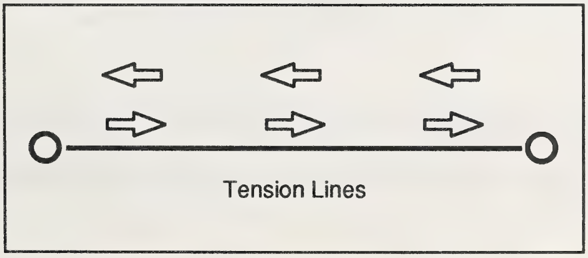
Did you discover in Drawing A that you needed three supports placed one at the head, one at the foot, and one under your buttocks?

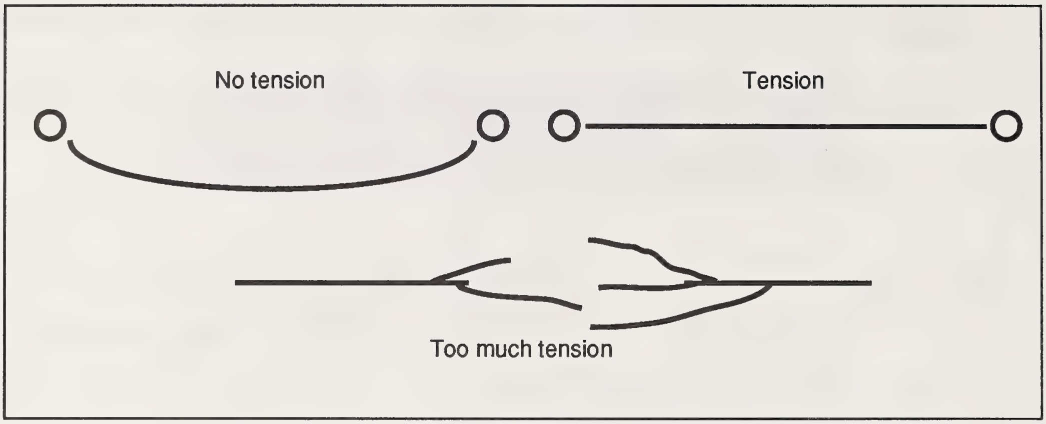
Did you discover in Drawing B that when you removed the middle support your body would begin to sag? Can you imagine where you would feel the greatest tension (force of push and pull) if you tried to hold yourself rigid in the air with not enough support?

When we talk about **pressure** we mean the force of some weight pressing down on a surface. Atmospheric pressure is exerted on every object that rests on or rises above the earth.

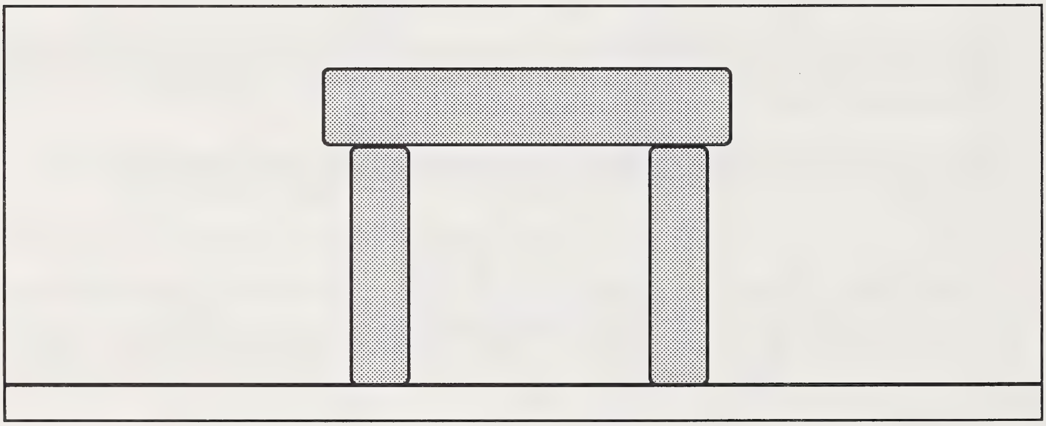


Tension means the stress that results from being stretched. If you stretch an elastic band you create tension all along the stretched piece. If tension becomes too great, the elastic breaks; if not enough tension is exerted, the elastic is too loose to be effective.



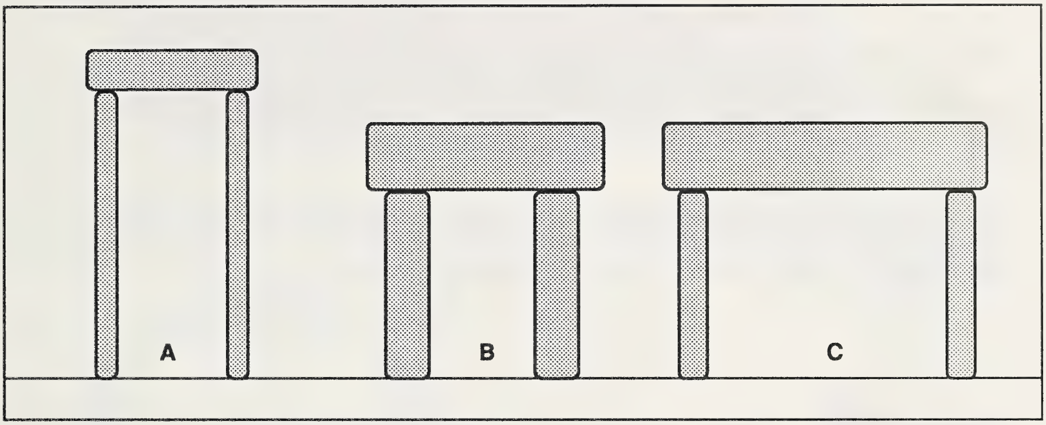


3. Here is a drawing of a post and lintel system. Draw solid arrows to show the direction of pressure. Draw dotted arrows to show the direction of tension.



Because of the force of gravity, every solid is attracted to the surface of the earth. Buildings have to counteract this gravitational pull. The post and lintel system overcomes gravity by positioning the upright posts so that they can support the weight of the horizontal beams.

Consider the following diagrams:



4. Use a solid arrow to mark in the lines of weight and tension on each figure.
5. Which structure seems most stable, A, B, or C? Explain.

____

____

____

____

6. Which structure seems most unstable, A, B, or C? Why?

____

____

____

____

Check your answer(s) by turning to the Appendix, Section 1: Activity 1.

Activity 2: Stonehenge

Relate some structural systems to meaning. Recognize and discuss a major architectural example.

You can design and build a post and lintel structure by placing strong cross beams on top of powerful, closely spaced, upright supports. Since such structures appear both strong, simple, and balanced horizontally and vertically, they can symbolize power and stability.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 12374.

OR

Turn to picture 172, Stonehenge, in your *Art 21 Booklet of Reproductions.*

Study also the cover picture of this booklet and Illustration 216 which follows.

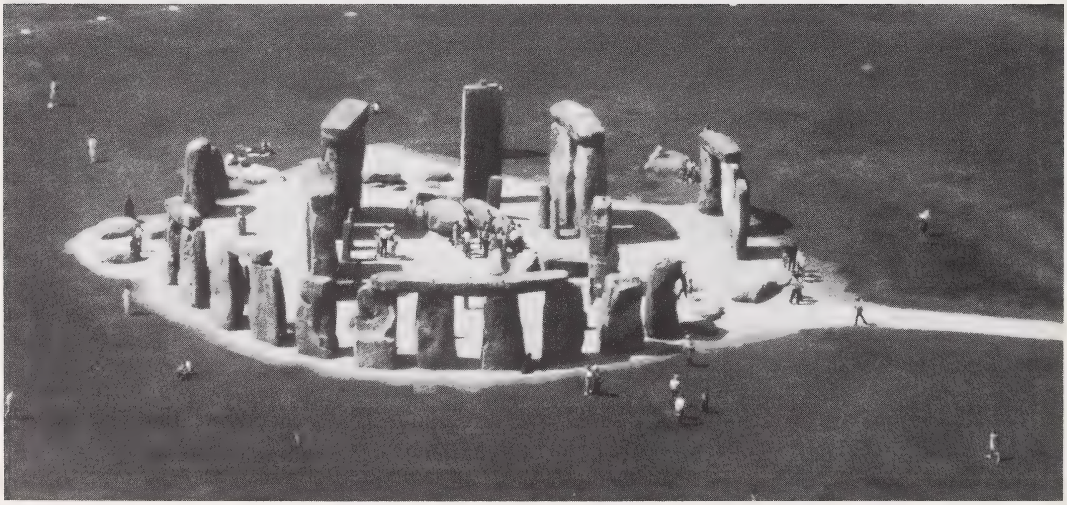


Illustration 216. *The Great Circle.* Stonehenge, England. National Trust. ART Resource, N.Y.

Stonehenge is one of the most ancient of the post and lintel structures. Stonehenge is a mystery. Built and rebuilt over a thousand years, the structure seems to have been a ritual centre for calculating and celebrating the summer solstice on June 20-21.

The ancient builders of Stonehenge paid special attention to structural design and detail. The posts and lintels are of grey sarsen* and blue stone quarried almost 300 miles from the site. These massive stones weigh about 5 tons each. The posts are carefully carved, tapered, and arranged so that from the centre of the structure the solstice sun appears to rise just to the left of the "observation post."

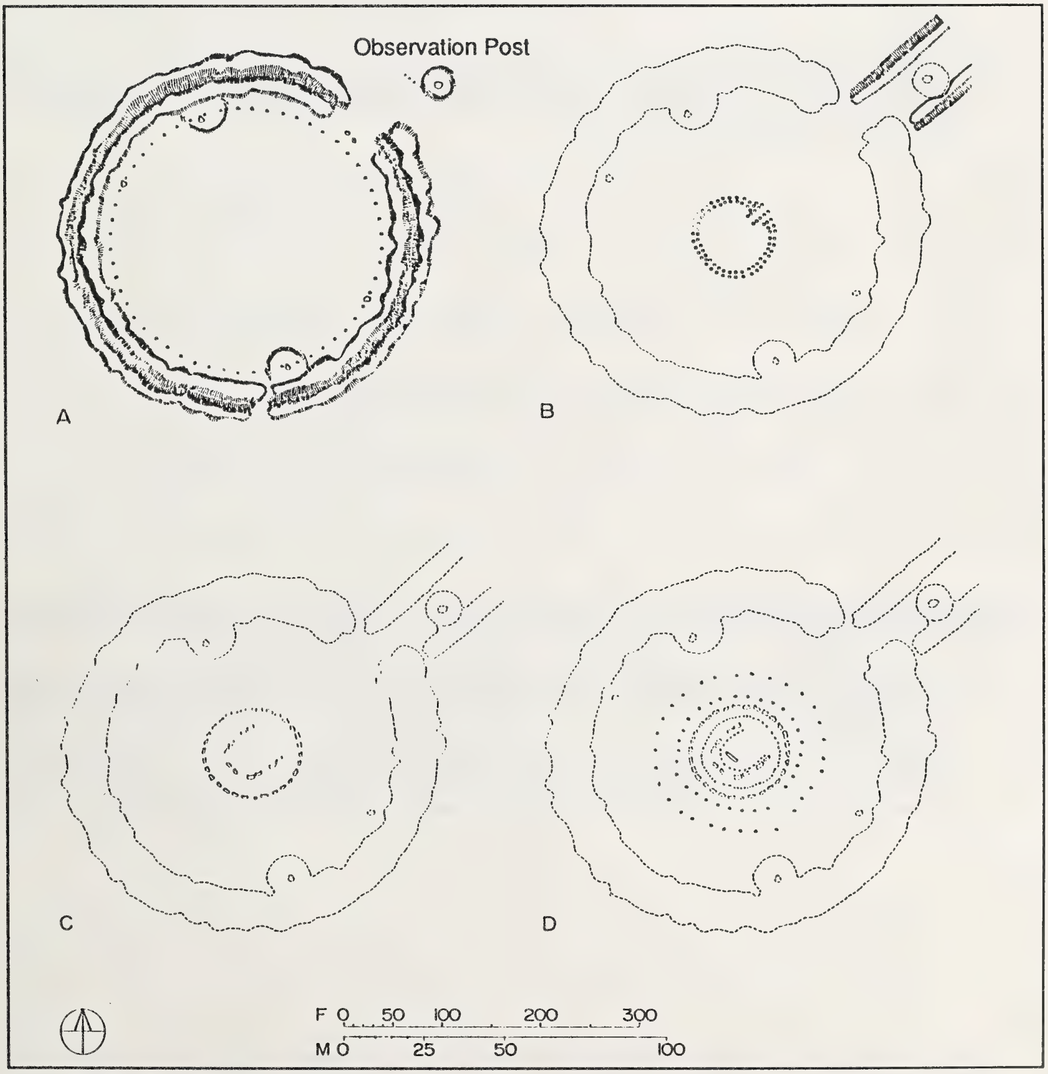


Illustration 217. Stonehenge Configurations.

Study Illustrations 216 and 217, the cover picture of this booklet, and picture 172 in your *Art 21 Booklet of Reproductions*, then answer the following questions.

1. What preparations might have had to be made to the land before the building began?

2. From the diagram and from the photo images of Stonehenge you have just seen, what evidence can you gather of the intention to make the structure beautiful and functional? (Review the discussion of the beautiful in Module 1.)

3. Write a sentence to describe the visual effect of Stonehenge.

Read the following paragraph:

> Stonehenge was a sacred center of community for the tribes that used it – a monument to their social cohesion* apparent both in their spirit of labor, when they toiled together to set up the megaliths,* and during their ritual gatherings, when an eclipse or a spectacular rising of the sun, having been predicted by the priestly powers, would summon the community to converge on the precinct to witness the event in unison. Public architecture at its best aspires to be just this: a setting for ritual that makes of each user, for a brief moment, a larger person than he or she is in daily life, filling each one with the pride of belonging.[1]

---

[1] From *A History of Architecture: Settings and Rituals* by Spiro Kostof. Copyright © 1985 by Oxford University Press, Inc. Reprinted by permission.

4. a. What evidence does the writer offer to conclude there was a community for Stonehenge?

b. Why does Spiro Kostof call Stonehenge “public architecture”?

5. Can you identify any post and lintel structures in your built environment? Where?

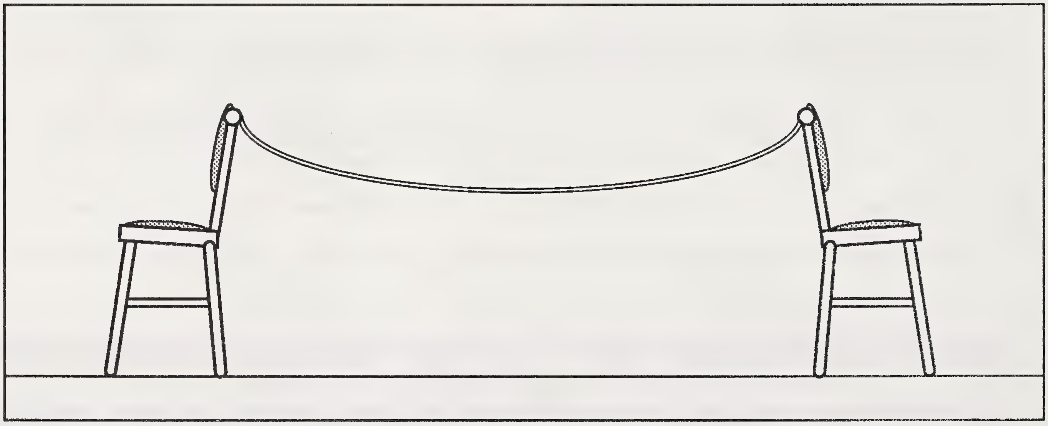
Check your answer(s) by turning to the Appendix, Section 1: Activity 2.

Activity 3: Arch and Vault

Become familiar with some common structural systems used in building.

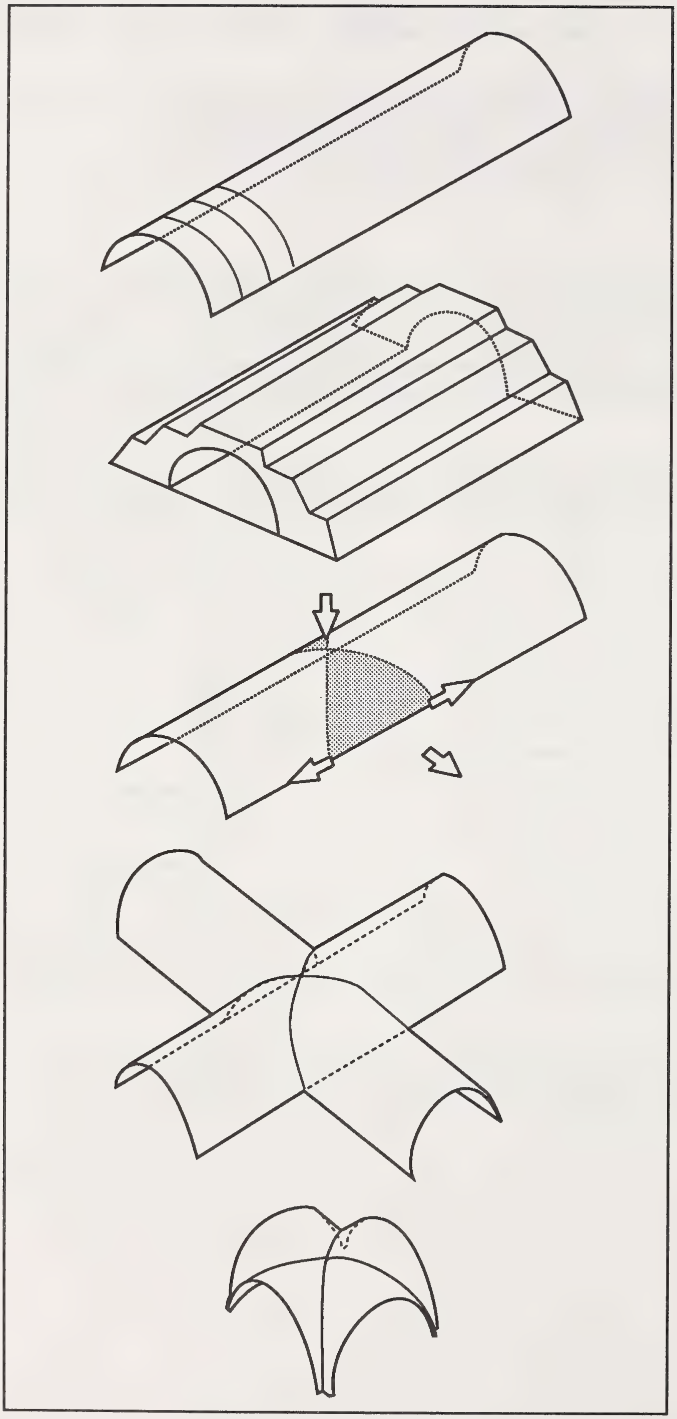
The post and lintel system is an efficient, clear, and simple way to span space and to hold up weight. If you imagine the interior space of a post and lintel building, you will realize that it is difficult to have large open spaces with this system because of the need to have upright posts at frequent intervals. If you want to span a larger space and create the effect of more soaring space, then another way of making a roof is needed. Ancient peoples found one: they designed another very stable structure to support weight – the **arch**.

If you attach a rope or a chain to two chair backs and move the chairs close together until the line of rope or chain sags, then the shape the rope or chain makes is the natural arch form upside down.



1. Now draw the arch form right side up in the space provided. The arch is like an inverted "U." Draw in the supports for the arch. Use a solid black arrow to show the push of gravity. Use a dotted arrow to show where the tension in the arch might be. Draw in the posts that would hold up the arch.

Draw your structure here.



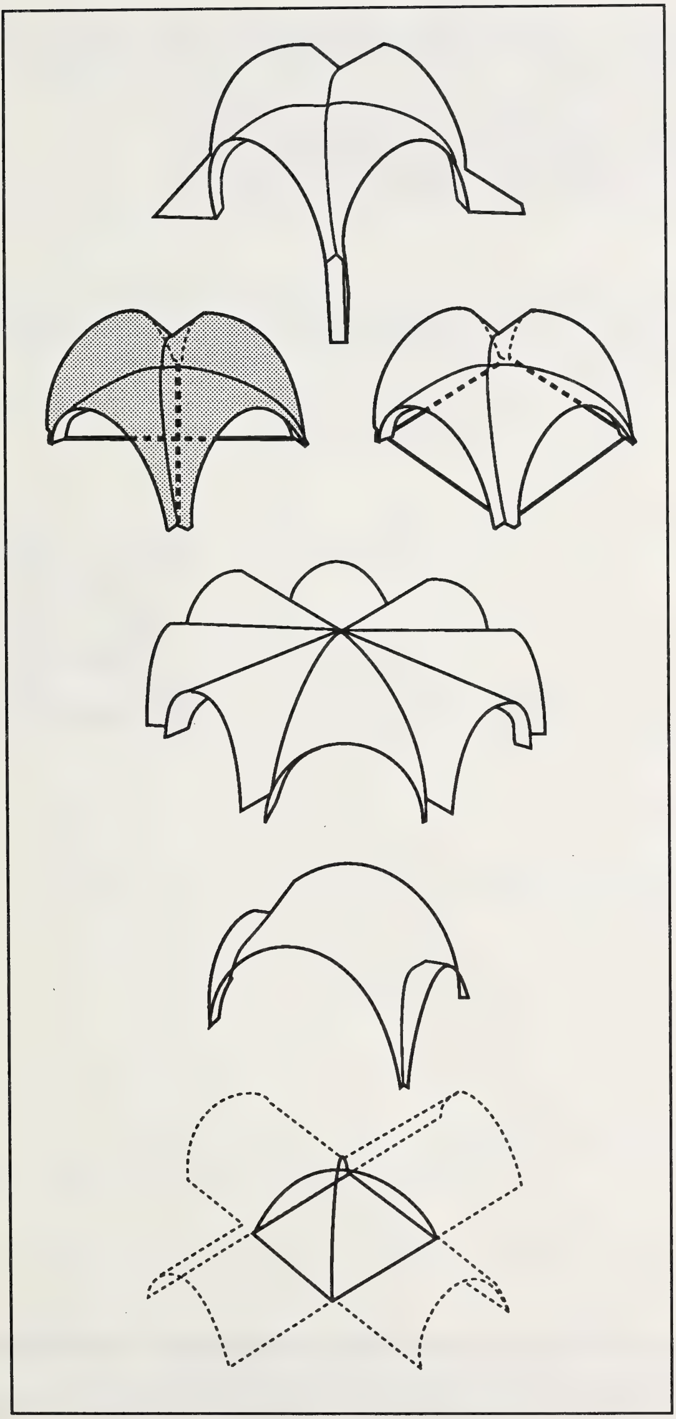
Arches by themselves do not cover much space, and are not stable in a lateral direction. A series of arches can be cross-braced and used to form an enclosure, but a more substantial solution is to extrude an arch into what is called a **barrel vault**.

Such a structure has all the attributes of the arch, and in addition is stable in both directions. It spreads its loads laterally along its footings. It also has to contend with problems similar to those encountered by an arch – outward thrust, for example. Buttressing can be used to resist the tendency to push outwards, but it is not practicable to use ties between the springing points of a barrel vault, because so many would be required at very close intervals.

Of course, a series of barrel vaults side by side would resist each other's outward thrust but, as with a row of arches, the problem still remains for the last vaults in the row. Buttressing for barrel vaults requires a large quantity of material, and sufficient space at the periphery of the structure.

However, in the past an ingenious use of barrel vaults enabled the designers of buildings to enclose space in very different ways. If two barrel vaults are allowed to intersect and pass through each other at right angles, and the four curved triangular segments now blocking each vault are removed, we are left with what is called a **groin vault**.

If the original barrel vaults are trimmed back almost to the points of intersection, we have a space-enclosing structure that concentrates its downwards and outwards thrust at four points.



This can be resisted either by buttresses opposing the newly diagonal arches, or by ties placed directly across the space on the diagonal or peripherally around the outside.

If a number of such groin vaults were arranged on a grid pattern side by side, the outward thrusts would be mutually resisted, and the outer bays would require buttresses or ties. The supporting piers or columns would only be resisting the downward loads on them, and so could be relatively slender. This has resulted in some remarkably large unencumbered spaces, all achieved by loadbearing masonry in compression only.

Some very complex groin vaults are possible. For instance, four barrels can intersect at 45° to each other to form a groin vault with an octagonal outline in plan.

Alternatively, barrels of different heights and spans can intersect to form beautiful variations.

Yet another space-enclosing structure can be formed by intersecting barrel vaults. For example, the four curved triangular segments from the first two intersecting barrel vaults can be retained, and the remainder discarded. The resulting structure is a **cloister vault**, or **cloister dome**.[1]

---

[1] From *Science of Architecture Viewer's Guide*. Reprinted with permission from TV Ontario.

Arches and piers* by themselves do not enclose spaces, but if you put many together you can create a vault. Imagine a barrel cut in half. A series of arches lined up behind each other in one direction makes a "barrel vault." Study the preceding notes and diagrams from *Science of Architecture Viewer's Guide*.

2. a. How many variations of roof designs can you make from the barrel vault?

   ____

   b. Take one example of a drawing of a barrel vault variation and use it as a roof design. Trace the vault pattern then draw lines downward to suggest walls. Add door and window details. Finish the drawing in black and white or in colour. Add landscape details if you wish.

Draw or paste your image here.

Check your answer(s) by turning to the Appendix, Section 1: Activity 3.

Activity 4: The Pont du Gard

Relate some structural systems to meaning. Recognize and discuss a major architectural example.

An early example of the arch used for function and for beauty is in the Pont du Gard, a Roman aqueduct* built about 18 B.C. across the River Gardon near Nîmes in Southern France. Two-hundred and fifty metres long, the Pont du Gard was designed to carry water 50 metres above the river to the city. This stone structure was both a water carrier and a bridge. Study the image carefully.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 3260.

OR

Turn to picture 173, Pont du Gard, in your *Art 21 Booklet of Reproductions.*

1. Make a short list of the forces that had to be considered before the Pont du Gard was built.

2. Look carefully at the picture of the Pont du Gard. Visually and structurally, where can you identify the greatest force and the greatest support?

3. Describe the design elements that you notice in the Pont du Gard. What visual effect does the movement from heavy to light elements create?

Check your answer(s) by turning to the Appendix, Section 1: Activity 4.

Activity 5: Domes and Shells

Become familiar with some common structural systems used in building.

Post and lintel systems encourage builders to give some emphasis to the design of the post; arches and vaults allow builders to make variations in the feeling of interior spaces and to create irregular rhythms in structural designs. Both post and lintel and vaults work with rectangular floor spaces. Sometimes an architect has need to enclose a space that suggests completion and centring, a space without corners – a circular space. To roof a circular space, early builders invented the dome. A dome can cover an open space without needing middle supports.

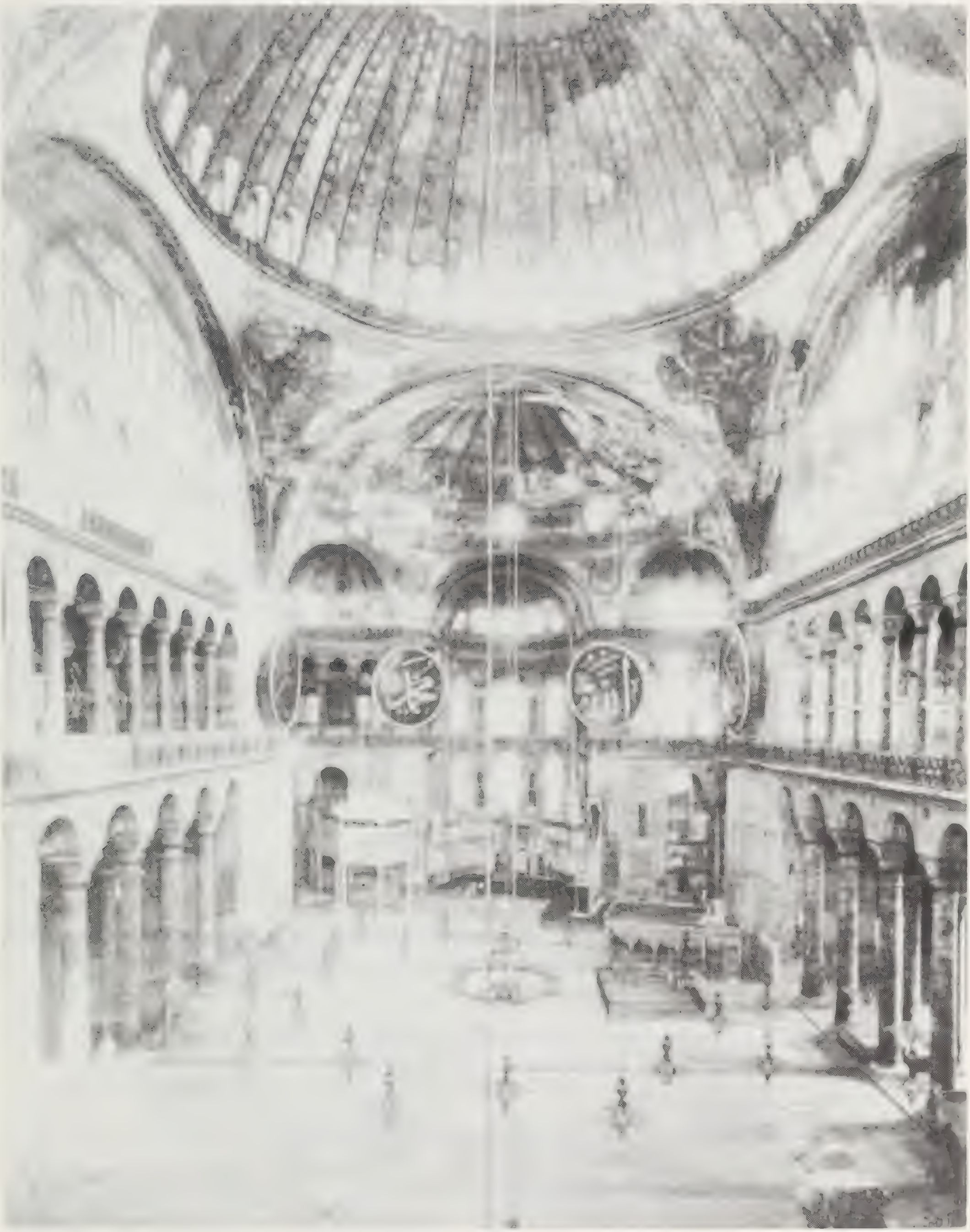
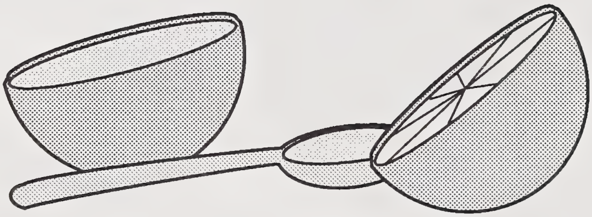


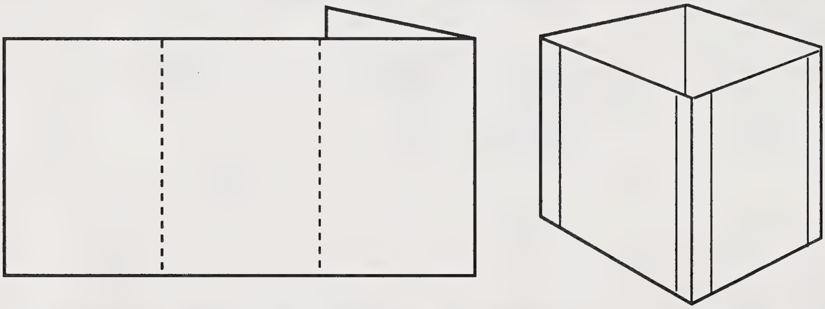
Illustration 218. *Hagia Sophia*, Istanbul (Interior), 532-37 A.D. Height of dome 183 feet. From *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc.

Take half an orange or grapefruit and hollow it out until you have a hemisphere.



This hollow hemisphere is the essential shape of a dome.

Use cardboard and cellophane tape to make a rectangular support for your "dome." You may have to make several experimental tries before you get a satisfactory solution.



1. What plans did you make before you decided on the size of the rectangular supporting space?

2. Draw a diagram to show how the orange/grapefruit hemisphere rests on the cardboard support. Highlight the supporting rectangle's corners.

Draw or paste your image here.

3. How would the supporting rectangle's corners appear from the inside? Can you think of any way to overcome the corner problems so that the circle of the dome could be emphasized from the inside?

4. To allow light into a domed building, where could you place openings? Try different possibilities. Draw a diagram of your decision, explaining your choice.

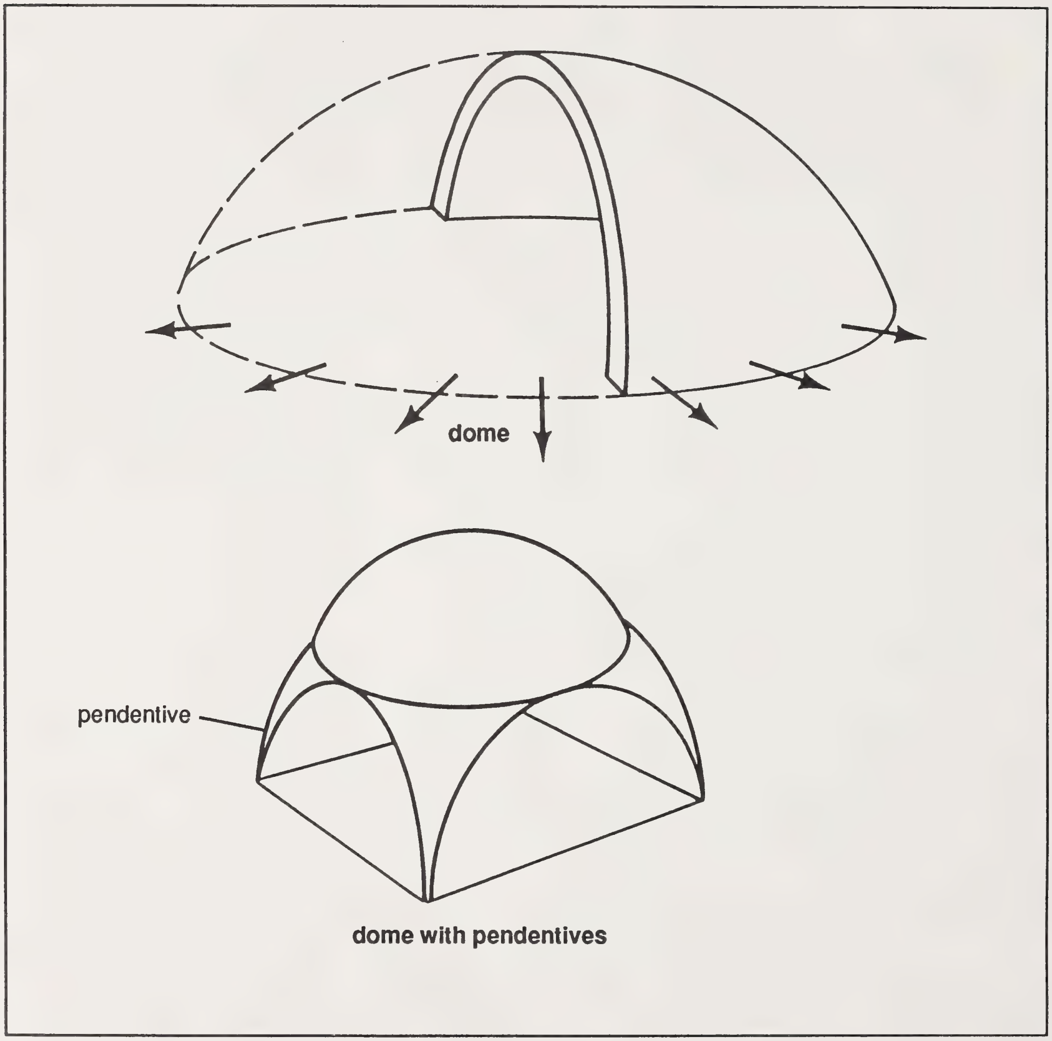
Draw or paste your image here.

5. Can you think of a different way to make a support for the dome? Draw your solution.

Draw or paste your image here.

Check your answer(s) by turning to the Appendix, Section 1: Activity 5.

A dome has to be supported by strong walls or pillars. To express a feeling of drama and mystery or to symbolize heaven by a great soaring circular space, the dome is usually elevated high above the heads of the people. To keep the feeling of perfection that a circle suggests, builders had to solve the problem of the transition* of dome to wall. One solution is the **pendentive**, a curved triangular section. You can see how the pendentive works from the following diagrams. See also Illustration 218, Hagia Sophia.



[1]

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[1] From *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc.

Activity 6: The Pantheon

Relate some structural systems to meaning. Recognize and discuss a major architectural example.

A famous example of a domed, circular building is the Pantheon, built in the city of Rome in 120-124 A.D. Buildings have meaning; they belong not only to the world of work, but also to the world of ideas. Buildings can tell you something about the way people organize their community, about the gods they worship, about the ways they exercise power.

In the first century A.D., the Roman Empire controlled most of the civilized world. All over the Roman Empire buildings were being constructed. The Emperor Hadrian travelled with his architects, builders, and decorators to put the stamp of Roman glory and power on as many cities as possible.

Hadrian was one of architecture's great "popularizers." He imported forms he admired to Rome from many points in the empire. Hadrian's villa at Tivoli was (and is) a showplace of likenesses of important structures of the ancient world.

The city of Rome was the centre of this empire, and the Pantheon was built to be the symbol of Roman glory and power. The Emperor Hadrian also intended that within the Pantheon worshippers would feel themselves to be at the centre of the universe.

The Pantheon is almost perfectly preserved, and it has had influence on many of the greatest buildings of Western civilization. Byzantine and Islamic domed buildings (Hagia Sophia in Istanbul, the Taj Mahal in India), many cathedrals (St. Paul's in London) and government capitals (Alberta Legislature, Washington Capitol) got their inspiration from the domed Pantheon.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 5478.

OR

Turn to picture 174, The Pantheon, Rome, in your *Art 21 Booklet of Reproductions.*

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 5479.

OR

Turn to picture 175, The Pantheon, Rome, in your *Art 21 Booklet of Reproductions.*

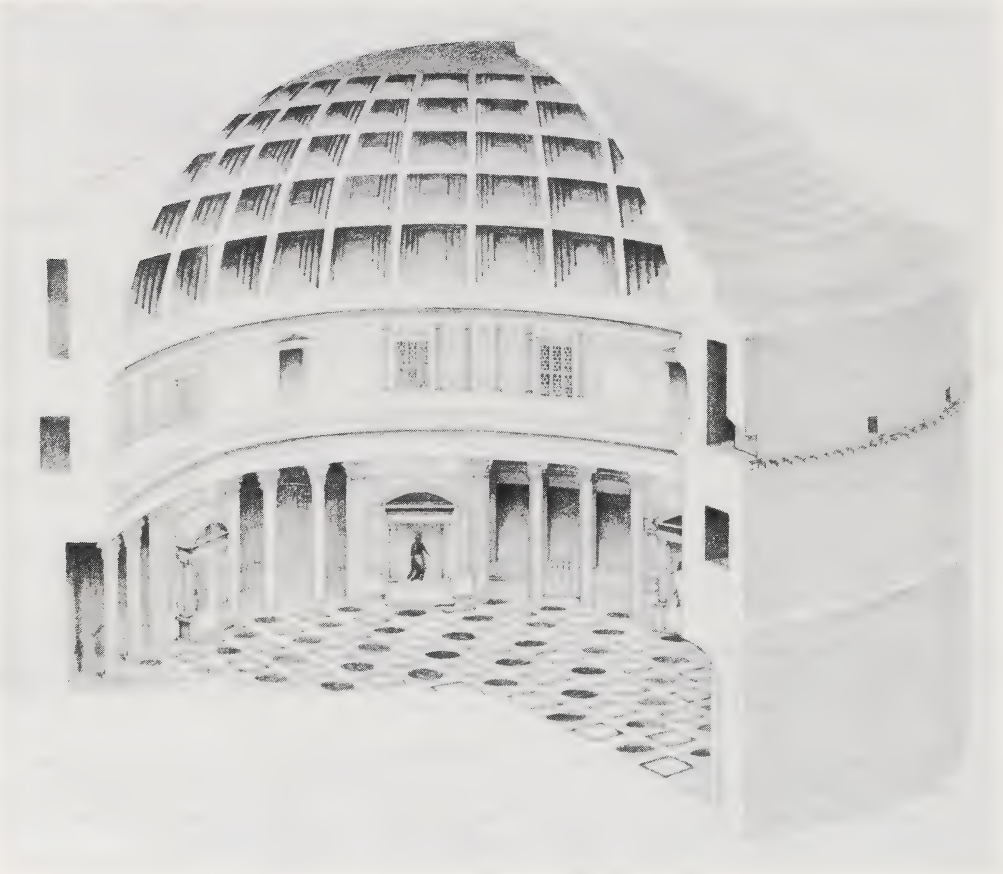
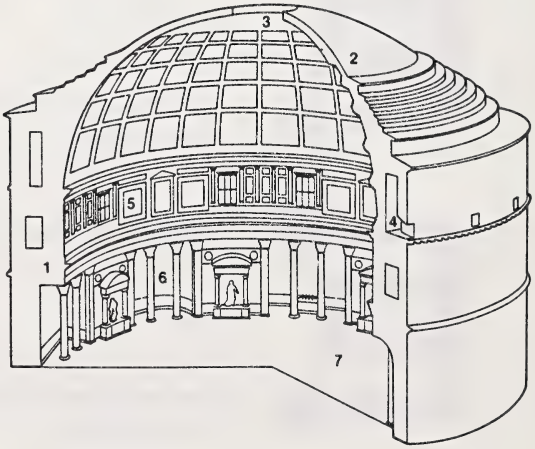


Illustration 219. The Pantheon. By permission of Equinox (Oxford) Limited and first reproduced in *Introduction to Architecture* by Stephen Gardiner.

The dome of the Pantheon

1	Brick and concrete walls, 20 feet thick.
2	Stepped dome of coffered concrete, 142 feet high
3	Oculus, or "eye," opening
4	Passage within wall/dome, window facing out
5	Attic story
6	Ground story with niches and recesses
7	Floor with patterning



Study pictures 174 and 175 in your *Art 21 Booklet of Reproductions*, and Illustration 219, then answer the following questions.

1. List the structural systems that you can identify from the cut-away drawing in Illustration 219.

2. How is the dome supported?

3. Describe as many of the building's details as you can observe.

4. How did the architect make the solid walls appear structurally lighter than they are?

The diagram which follows is a floor plan. Solid dark areas are walls and piers*. Round shapes are columns. A floor plan can give you information about the space organization of a building. Study the diagram and consider the Emperor Hadrian's ideas for the Pantheon.

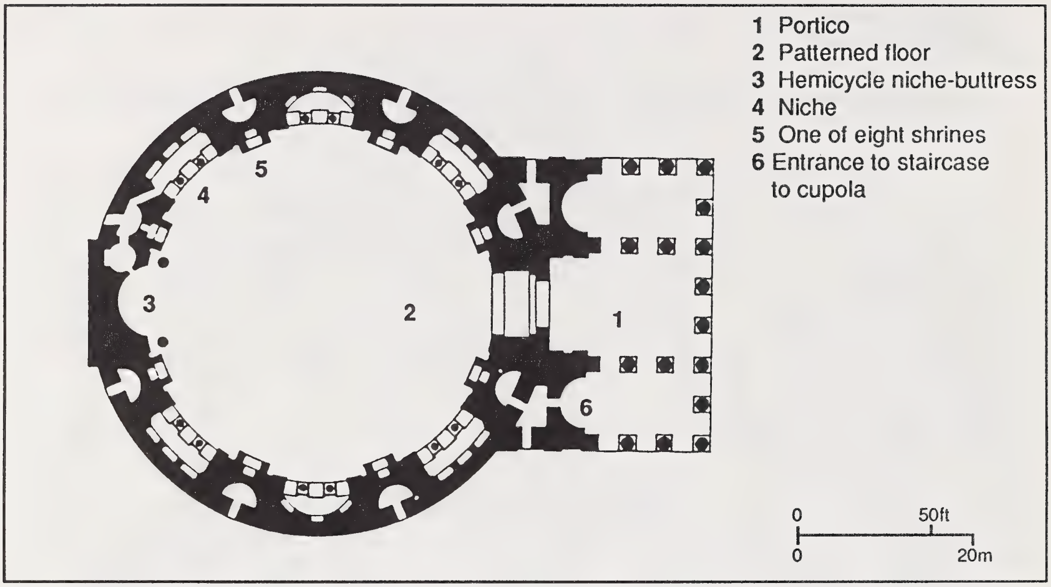


Illustration 220. The Pantheon, Floor Plan. By permission of Equinox (Oxford) Limited and first reproduced in *Introduction to Architecture* by Stephen Gardiner.

The major themes that the Emperor Hadrian wished to express in the Pantheon were

- The Pantheon was to be a temple to all the gods and this temple was to reflect the heavens – the home of the gods.
- The Pantheon was also to be a court, suggesting the Roman Empire as the centre of the world.
- As a court and as a temple to all the gods, the Pantheon was intended to symbolize the connection between heaven and earth.

5. From the images and the floor plan of the Pantheon, gather evidence of the expression of these themes in the building. List the elements of the Pantheon that would fulfil Hadrian's intentions.

Check your answer(s) by turning to the Appendix, Section 1: Activity 6.

Activity 7: Steel and Concrete

Become familiar with some common structural systems used in building. Relate some structural systems to meaning. Recognize and discuss a major architectural example of the system.

Post and lintel, arches, vaults, and domes – these structural systems were basic for thousands of years. It was not until the nineteenth and twentieth centuries that new building materials encouraged architects and designers to create new structural systems. The new material was metal: iron and steel. The new system was the metal skeleton. Iron, although known and used for centuries, had not been considered as a material for an independent frame. Steel was a new invention. Recall the structures you have considered in this section: Stonehenge, the Pont du Gard, the Pantheon; all are massive and heavy; all required the support of great posts and walls of stone or concrete or both. With iron or steel as the support, you can make a very strong frame and support system that seems light. In stone, concrete, and brick building, the skeleton is usually the skin as well. In a steel frame building, the skin can be the lightest of elements for the skeleton supports nearly all the weight. This makes the building easier, faster, and cheaper to build.

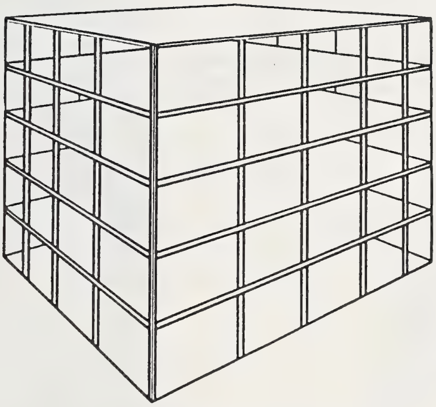


Illustration 221. **Steel-frame construction**. Diagram from *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc.

In 1989 the one hundredth anniversary of the Paris World's Fair was celebrated. For that remarkable 1889 event, Gustave Eiffel, a French engineer, built an iron tower 1056 feet tall as the Fair's centrepiece. The Eiffel Tower, as it came to be known, had a significant effect on architecture. Eiffel was also a pioneer in the design of elevators. The invention of the elevator also played a role in the construction of the new tall buildings.

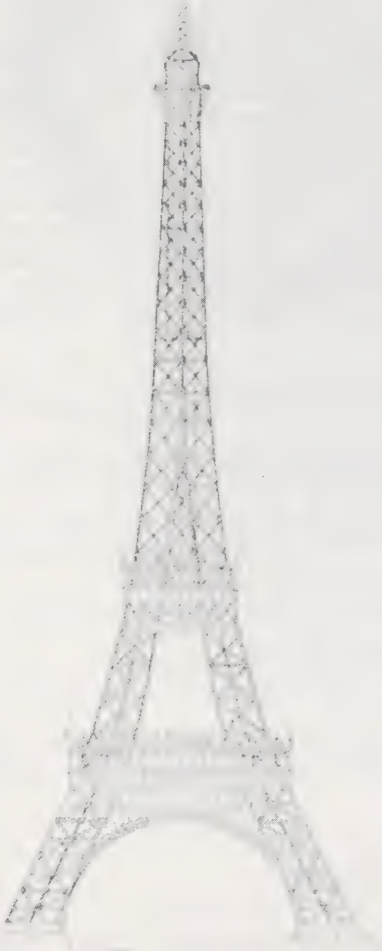


Illustration 222. Gustave Eiffel. Eiffel Tower, Paris, 1889. Elevation. *Meaning of Western Architecture* by Christian Norberg Shulz, published by Rizzoli, New York, and Electa, Milan. Used with permission.

Close-up of section of the Eiffel Tower.

1. Can you think of two major new concepts (or ideas about buildings) that the Eiffel Tower contributed to architecture?

2. Many of Gustave Eiffel's contemporaries ridiculed the tower when it was proposed. What reasons could you give for this reaction?

3. In 1889, the Eiffel Tower was the world's tallest structure. Those who reached the observation platform could see Paris from an entirely different point of view. How might this experience change art?

Once architects realized that a metal frame could by itself support a structure, they were free to use many different materials for the "skin."

4. The following chart contains a list of materials that can be used for the walls of frame construction. Since the walls in a metal frame construction need not bear weight, they can be made of many different materials. For each material listed, name one advantage and one disadvantage.

	ADVANTAGE	DISADVANTAGE
WOOD		
BRICK		
GLASS		
STONE		

Most private dwellings in North America are wooden frame constructions called balloon-frame*. When this method of building was invented in the nineteenth century, many thought such buildings would soon collapse like balloons. Such buildings are, however, quite durable. A balloon-frame house is a true skeleton and skin construction.

5. Have you ever seen a house under construction? A wooden frame is built, and this frame is then covered. Look carefully at the houses and buildings in your community. List the structural systems that you see in use and the various "skins" that cover the frames.

6. Steel frame buildings can rise hundreds of feet above ground. Wooden frame constructions can rise only a few stories. Explain the reason for this.

Check your answer(s) by turning to the Appendix, Section 1: Activity 7.

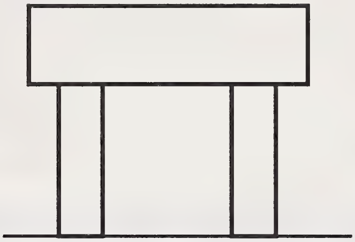
Follow-Up Activities

If you had difficulty understanding the concepts in the activities of this section, it is recommended that you do the Extra Help. If you have a clear understanding of the concepts it is recommended that you do the Enrichment.

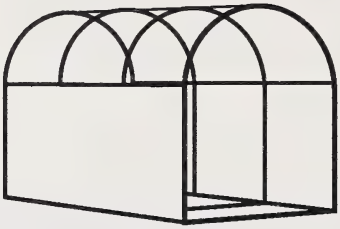
Extra Help: A Review of Structural Systems

1. Each of the drawings that follow represents a structural system you have studied in this section. Select the proper label from the word list and write it in the blank space provided.

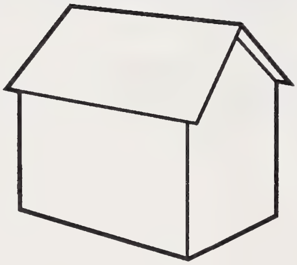
Post and lintel
Dome and pier
Arch and vault
Skeleton and skin



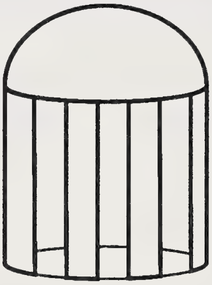
a.______________________________



b.______________________________



c.______________________________



d.______________________________

2. Review this section carefully, then for each structural system listed in the following chart indicate some of the possible architectural meanings that could be expressed by a building that used that system.

STRUCTURES	POSSIBLE MEANINGS
POST AND LINTEL	
ARCH AND VAULT	
DOME	
STEEL FRAME	

Check your answer(s) by turning to the Appendix, Section 1: Extra Help.

Enrichment: An Architectural Student

You are a beginning architectural student. Your teacher has given you the following two floor plans (Illustrations 223 and 224). From each you are to suggest the kind of building that resulted from the plans. Estimate the size, suggest the materials and the structural systems you think are required, and suggest a use for the structure. You may choose one of the plans and complete a drawing of the building you imagine would result from that organization of floor space.

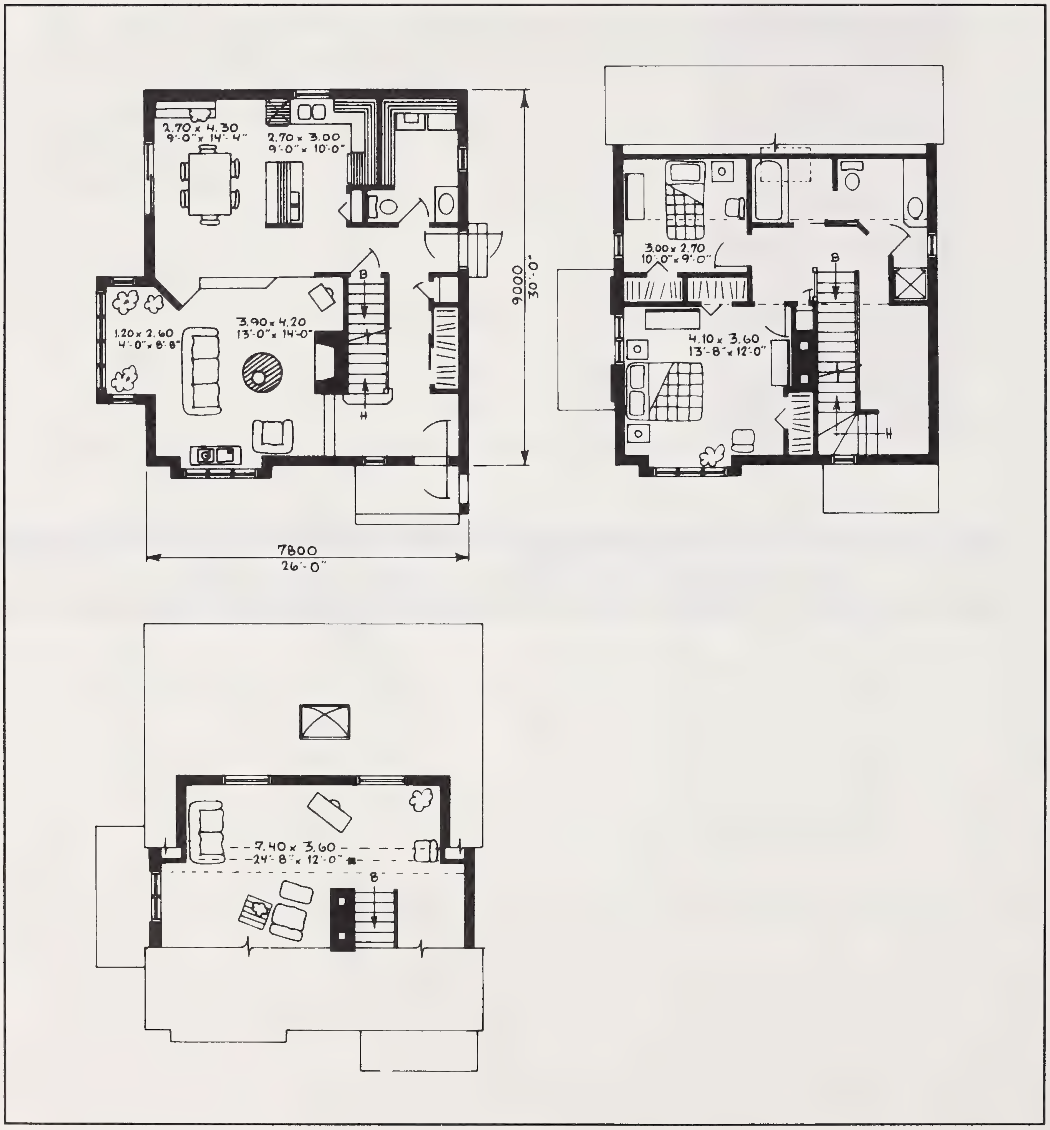


Illustration 223. Used with permission of *Select Homes and Food*, February, 1989. Architect Renée Cayer of Les Dessins Drummond Inc. Drummondville, Quebec.

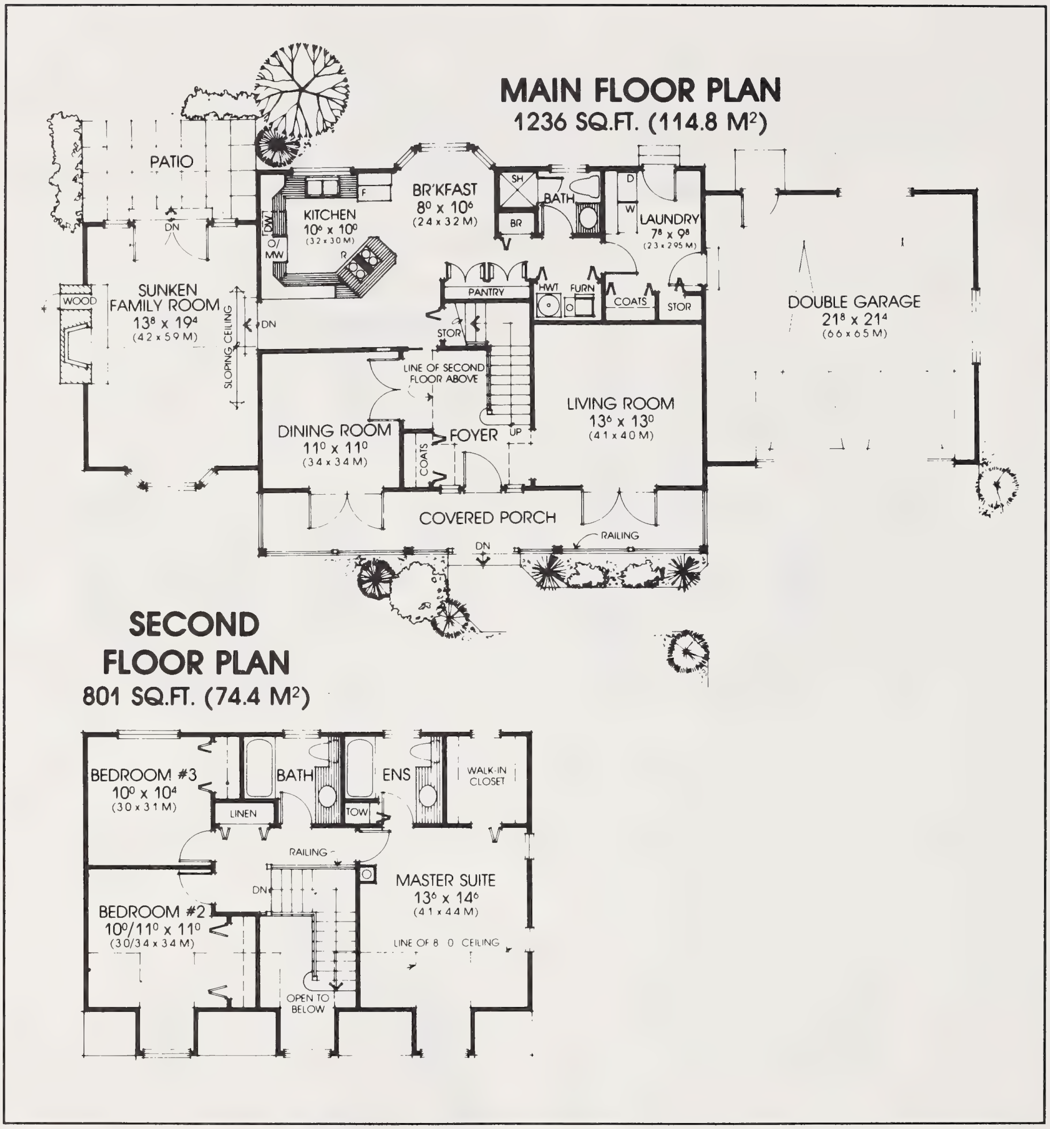


Illustration 224. Used with permission of *Select Homes and Foods*, February, 1989. Architect Al Goertzen of Jenish House Design. Courtesy of Jenish House Design Limited, New Westminister, B.C.

Draw or paste your image here.

Check your answer(s) by turning to the Appendix, Section 1: Enrichment.

Conclusion

In this section you learned something about some of the basic structural systems and their possible meanings in architecture. You learned that buildings can be both structure and symbol. In the sections that follow, you will learn more about architecture as the expression of ideas.

Assignment Booklet

Turn to your Assignment Booklet and do the assignment(s) for this section.

SECTION 2

CIVIC CENTRES AND PUBLIC VALUES

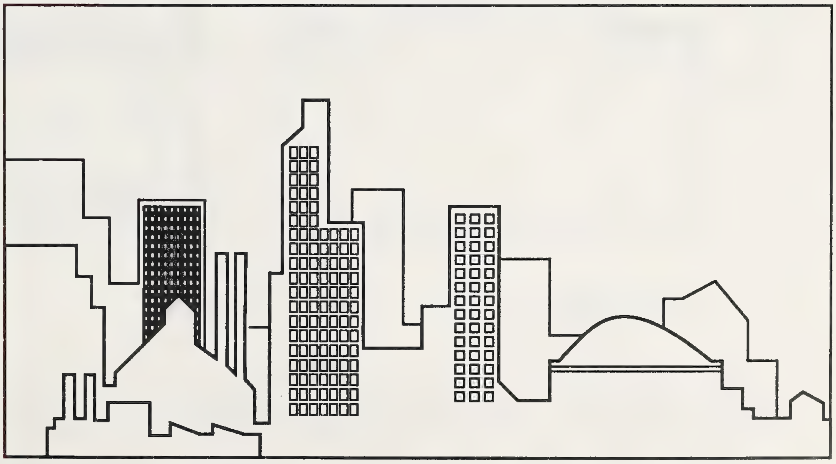
How can a building have meaning? How can you learn what a building means? A building can express certain cultural values of a people, or it can exactly suit a ritual purpose, or it can provide the most suitable space for some civic activity. A specific building can be the first of its kind to use some new material, or to reach a certain height, or to use a new structural system and so influence the design and structure of many subsequent buildings.

Temples, churches, civic centres, palaces are all places that speak of special rituals, powers, and beliefs. They are all buildings that express a society's values. Such buildings focus attention on public celebrations and community events and so make cultural meanings visible.

By considering some of these special buildings, learning **what** they are, **how** they came to be, and **why** they are the way they are, you can begin to learn to look at public buildings as social and as artistic statements.

After completing this section you will

- recognize some of the significant landmarks of architecture
- understand how the design of a building reflects its purpose
- be able to appreciate the ways a building reflects a community's values
- demonstrate how changing cultures, new materials, and technology change architecture



No matter what the significance, all buildings begin with the purpose (i.e., the special function) for the building. Once the purpose or function of the building is known, the architect begins the careful plan that includes the organization of the spaces, the use and quality of the materials, the colours, and the many details of construction. As you learned in Section 1 of this Module, the floor plan is the flat design that shows the arrangement of the spaces. The elevation drawings show how the outside of the building will look when it is finished. The section drawing shows a slice through the building.

To help you understand how architects visualize and plan, look at the following drawings of a meat pie. The front, the bottom layer, the side, and the cut-through are shown.

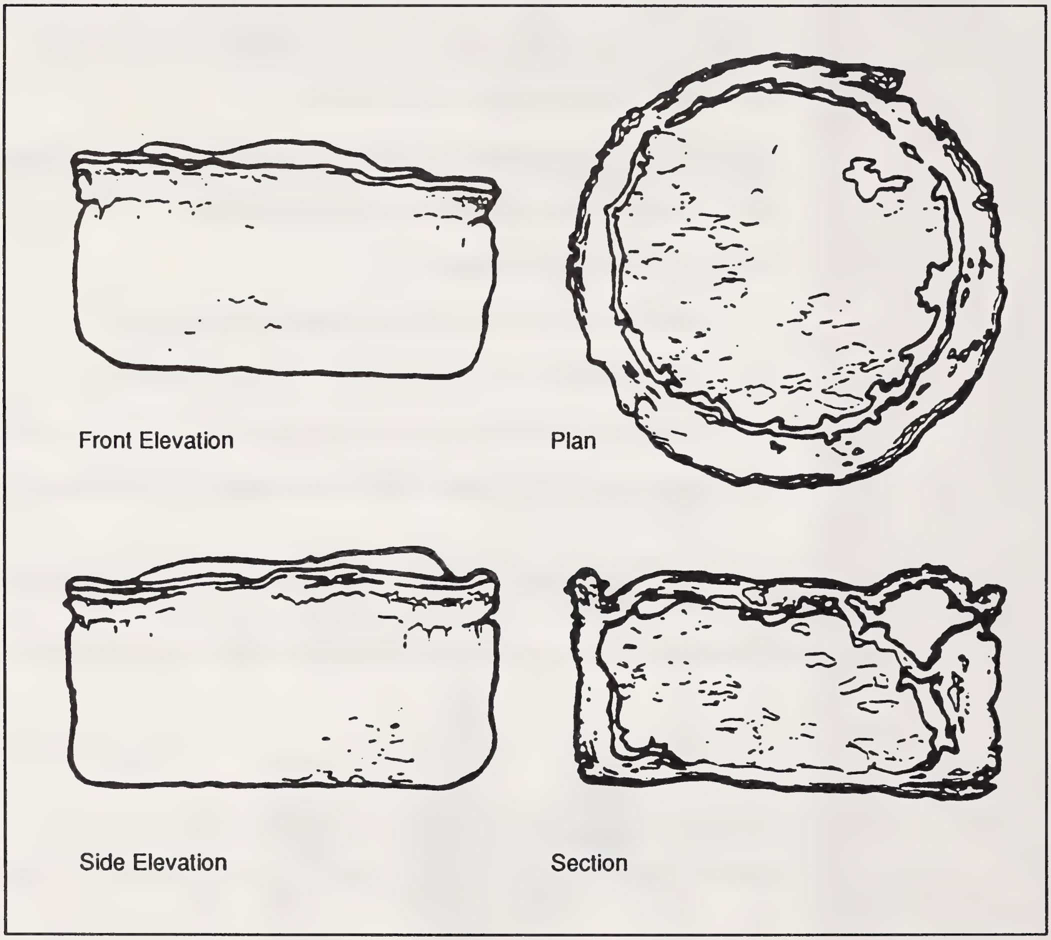


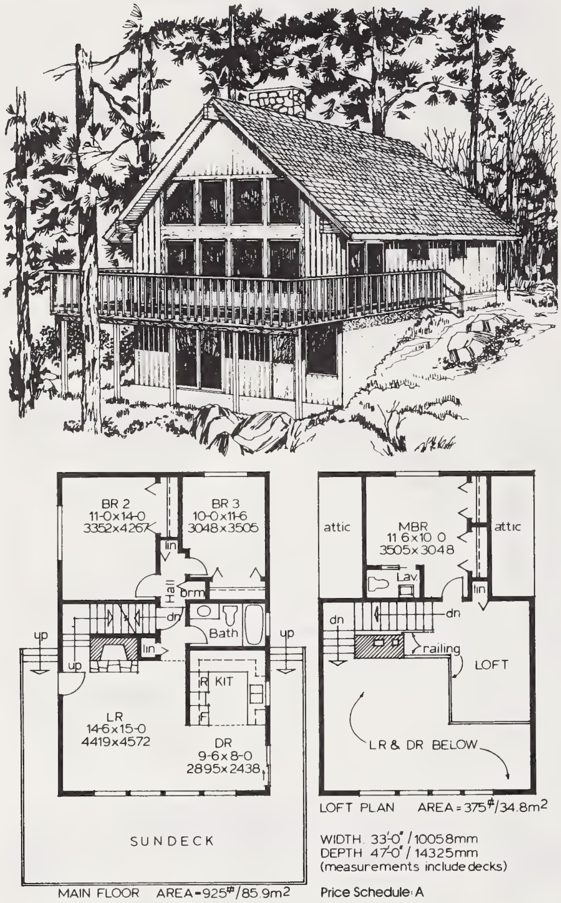
Illustration 226. Drawing of a Meat Pie from *How Architects Visualize*, by Tom Porter. Van Nostrand Reinhold Company. 1979.

Select any one of the following: a full box of chocolates, a ham sandwich, a green pepper, a candy bar. Draw to full size a **plan**, one **elevation**, and one **section**. The plan should show the bottom layer just above the base; the elevation drawing can show the front or the side; cut your object through the middle to show the section.

Draw your plan here.

Your drawings should help you visualize buildings from plans, elevations, and sections. Now look at the following floor plan and elevation for a residence. See if you can relate the organization of space in the floor plan to the exterior shapes and details in the drawing. Does the organization of space suggest a purpose?

Every building uses a structural system and a special plan to achieve its purpose. Any major change in a plan, in a structural system, or in the choice of material changes both the look of the building and the feel of the interior spaces. Both the organization of the inside spaces and the organization of the exterior shapes and details express a building's purpose.



T107

Vacation Home

Style: Classical A-frame

Layout: A wide sun deck wraps the front of this home, providing easy access to the main floor. The vaulted ceiling with overlooking loft gives a feeling of spaciousness. Two large bedrooms are on the main floor with the master bedroom and ensuite situated in the loft.

Living space: 1,300 square feet

Special features: This house may be built with or without a basement.

Illustration 227. Floor Plan. Used with permission of *Select Home and Food*, February 1989. Artist Michael A. Giroux, home designer, G.T. Giroux/Westhome Planner Ltd.

Activity 1: The Ancient World

Recognize some significant landmarks of architecture.
Understand how the design of a building reflects its purpose.

Have you seen the parade of the Olympic athletes? Perhaps you saw the Rose Bowl Parade? If you graduate from university, you will join in the march of the graduates. The ritual of procession seems a universal way of celebrating a significant event. Processions can also be part of special rituals that express civic pride.

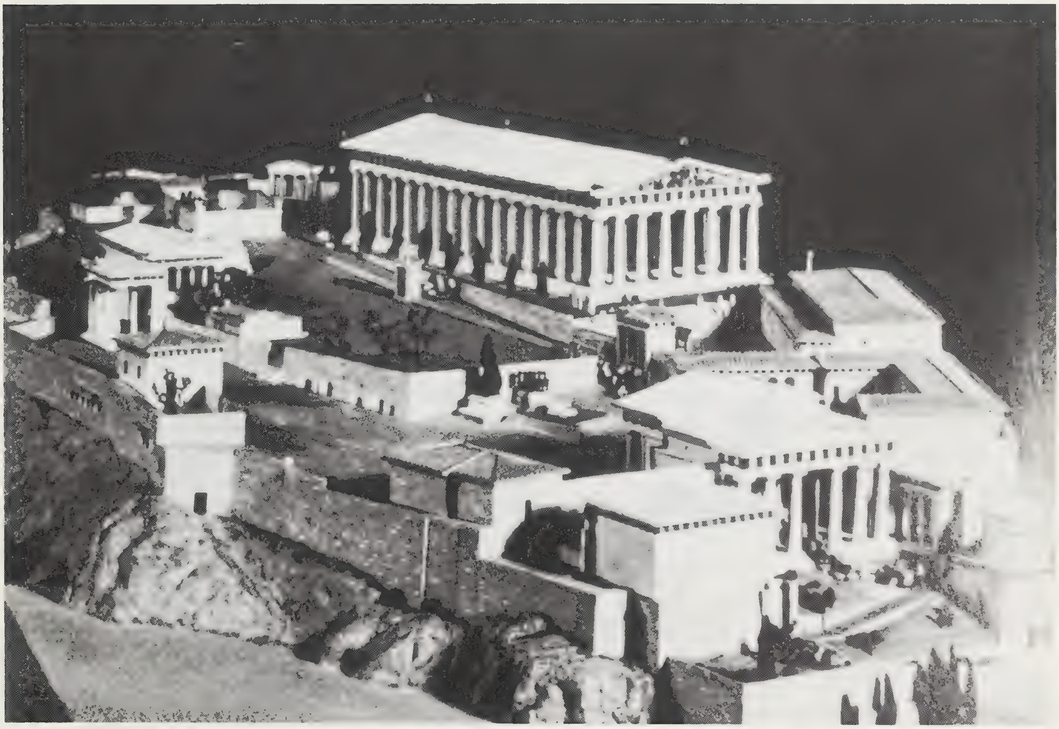


Illustration 228. Model of the Acropolis by G.P. Stevens. Royal Ontario Museum, Toronto. Note the location of the Parthenon. See also *Sightlines*. Greece, Architecture, the Acropolis.

In ancient Athens, a four-yearly procession honoured the goddess Athena, the patroness of the city. Soldiers, horsemen, elders, maidens, musicians, cattle for sacrifice, all made their way to the Acropolis, the sacred hill overlooking the city. Honouring the goddess Athena was an important part of social and political life in Athens. In the fifth century B.C., Pericles, the leader of the city-state of Athens, began a building program to make his city a showplace. He chose the Acropolis for the site of the most important buildings.

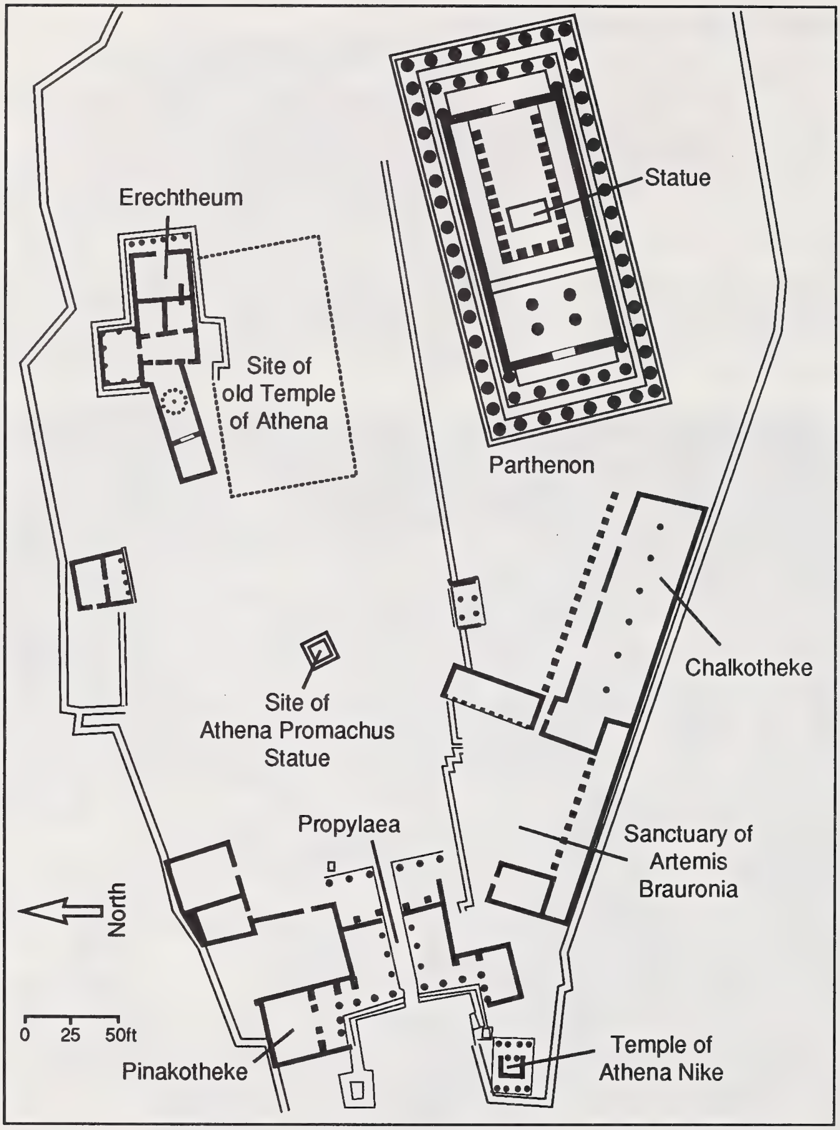


Illustration 229. Plan of the Acropolis, restored as of 400 B.C.

1. Can you think of two reasons why the Acropolis was a suitable choice for such structures?

The most famous building on the Acropolis is the **Parthenon**, a temple built to house the statue of the goddess Athena and to receive the offerings from the ritual procession.

Study the **plan**, **section**, **elevation**, and **decoration** of the Parthenon. Refer to Illustration 229 for the plan. (Note the Parthenon is in the upper right hand corner.) See Illustration 230 for the section; study the photographs in Illustrations 210 and 228 and pictures 130, 131, and 132 in your *Art 21 Booklet of Reproductions* for elevation and for decorative details.

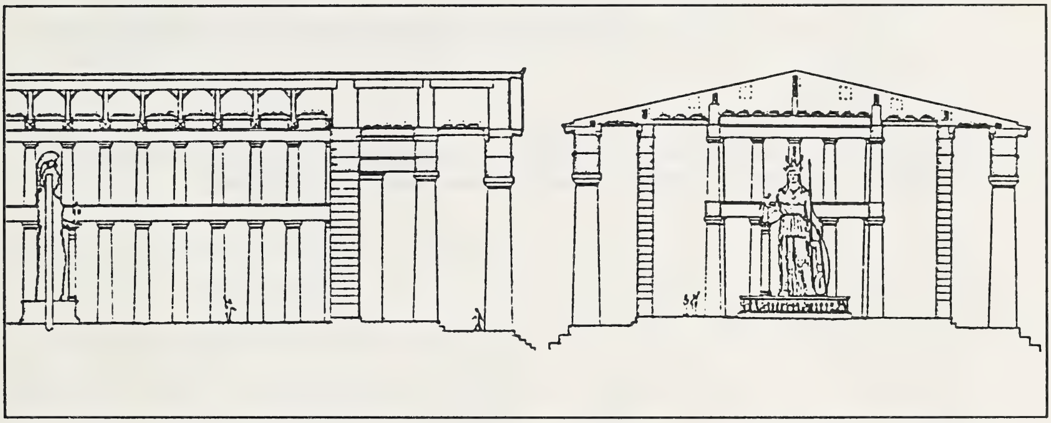


Illustration 230. Sections through the cella of the Parthenon, Athens, showing the cult statue (after Stevens). Third quarter of 5th century B.C. From *Greek Art and Architecture* by John Boardman, José Dorig, Werner Fuchs, and Max Hirmer. Harry N. Abrams, Inc. Publishers, New York. Used with permission of Hirmer Verlag München.

In Section 1, you learned how to read a plan. You will recall that a section is an imaginary cut through the centre of a building to show its internal structure. The plan of the Parthenon (Illustration 229) shows by light lines where the steps are, the solid dark lines show walls, the dark circles show columns. There are two sections (Illustration 230). One shows the interior plan front to back; the other the interior plan side to side. Look at the plans, sections, and pictures of the Parthenon and answer the following questions.

2. What is the basic structural system of the Parthenon? (Review Section 1)

3. What decorative details have the designers, Ictinos and Callicrates, added to make the building beautiful?

4. Some figures suggesting people are included in the section drawing. What do these figures tell you about the scale of the space in the Parthenon?

5. Imagine that you are a member of the Athenian procession. Describe your sensations and thoughts as you approach the Parthenon. Write at least three sentences.

6. The worshippers did not enter the temple itself, but paraded around it. What details of the design of the building suggest that the outside was meant to inspire the people?

Read the following from Pericles' famous Funeral Speech for those who had fallen in the Peloponnesian War.

> Our love of what is beautiful does not lead to extravagance; our love of the things of the mind does not make us soft. We regard wealth as something to be properly used, rather than as something to boast about...What I would prefer is that you should fix your eyes every day on the greatness of Athens as she really is, and should fall in love with her. When you realize her greatness, then reflect that what made her great was men with a spirit of adventure, men who know their duty, men who were ashamed to fall below a certain standard.[1]

7. How does the Parthenon reflect Pericles' ideals for Athens?

Check your answer(s) by turning to the Appendix, Section 2: Activity 1.

Activity 2: Design Details in the Parthenon

Understand how the design of a building reflects its purpose.
Appreciate the ways a building reflects a community's values.

The Parthenon is an impressive example of post and lintel structure. As you learned in Section 1 of this Module, such structures invite builders to give special emphasis to the posts and to add a structural element, the triangular-shaped pediment which supports the pitched roof. Look again at the plans and pictures of the Parthenon listed at the beginning of this section, and study the drawing that follows (Illustration 231). (Note: The technical description and terms have been included only as a matter of interest. You will be responsible only for the terms and descriptions which follow in the remaining questions.)

---

[1] Excerpt from *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc. Original from Lucydides, *The Peloponnesian War*, Translator Rex Warner (Penguin, Baltimore 1954).

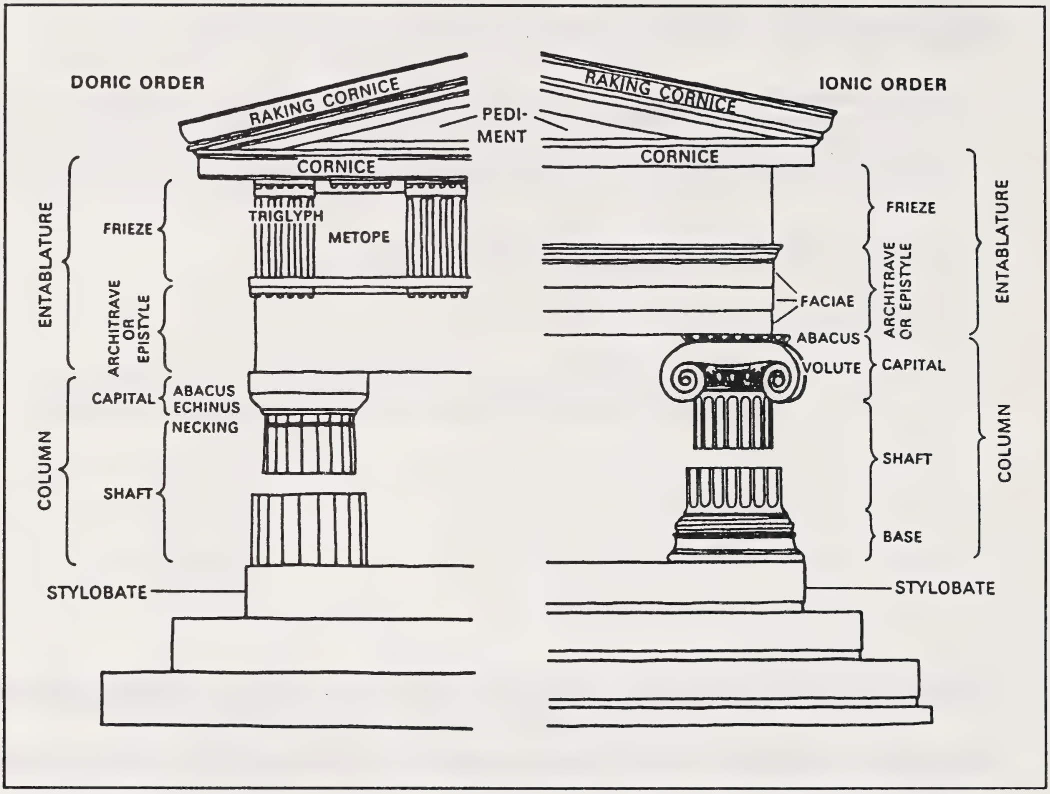


Illustration 231. Doric and Ionic Orders. From Gardner's *Art Through the Ages*, seventh edition. Copyright © 1980 by Harcourt Brace Jovanovich, Inc. Reprinted by permission of the publisher.

1. How have the upright columns been changed from a simple upright post design? List as many of the details as you notice.

The special design of a Greek column including the base and top is called an **order**. In architecture, a Greek order means a standard way of designing and building a supporting column. Study the drawing again and locate the following parts:

- the **steps**
- the **shaft** (in some orders, the column rests on a base)
- the **capital**
- the **entablature*** (includes the architrave or cross beam that rests on the capital and the frieze, a space above the beam that may be decorated)

Look closely at Illustration 232 to compare the column styles in the three Greek orders: **Doric, Ionic, Corinthian**.

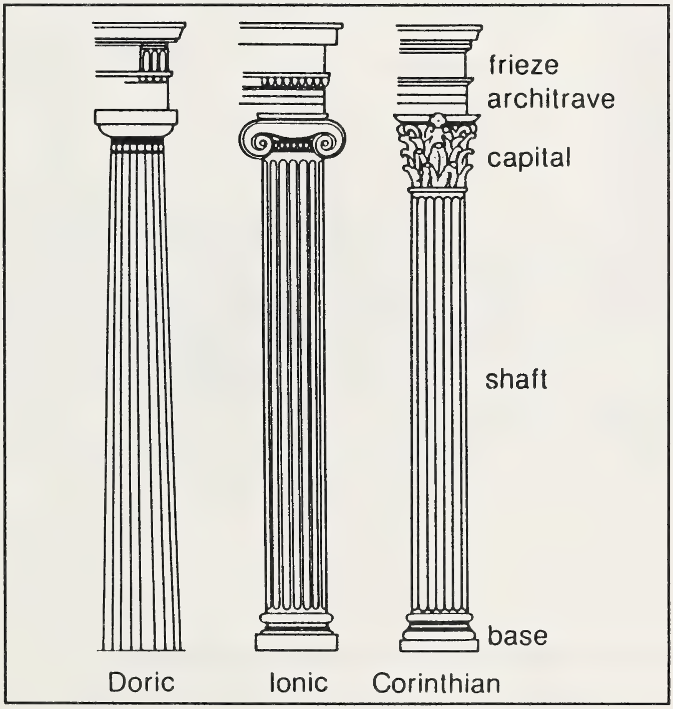


Illustration 232. Drawing from *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc.

2. Study the examples of columns in Illustrations 231 and 232 and complete the following chart by describing each part.

	DORIC	IONIC	CORINTHIAN
BASE			
SHAFT			
CAPITAL			
ENTABLATURE: ARCHITRAVE			
FRIEZE			

3. Now that you have noted the major differences in the details of the three Greek orders, consider some of the effects of these changes.

   a. Which of the orders has the effect of greatest stability?

   ____

   ____

   b. What design elements contribute to this feeling of stability?

   ____

   ____

c. Which of the orders seems lightest and most decorative?

d. What design elements express this lightness?

4. Since the time of ancient Greece until now, the Greek orders have been used for the columns on public buildings. Many nineteenth- and early twentieth-century commercial buildings (e.g., banks, government buildings, offices) decorated their buildings with the Ionic order. Why do you think the designers of these buildings made the choice to add a Greek order to a modern building?

You learned that the triangular shape that rests on the entablature is the **pediment**. As a member of the Athenian procession you would see the west pediment as you approached the Parthenon. The pediment was filled with sculpture depicting the struggle between the goddess Athena and the god Poseidon for the patronage of Attica, the region in which Athens stood. All Greek cities had their own patron deities.* The sculpture showed the moment that Poseidon struck the earth with his trident and a salt spring gushed forth; Athena's lance brought forth the olive tree, the source of Athens' wealth.

5. Explain why this subject is a suitable and significant choice for the west pediment.

Check your answer(s) by turning to the Appendix, Section 2: Activity 2.

For centuries, historians thought that the Parthenon was pure white marble. Now it seems that the Parthenon's decoration, sculpture, and ornamentation was originally painted in brilliant reds, blues, yellow, and black. Look at an artist's idea of how a corner of the temple looked in the fifth century B.C.

Turn to picture 176, Artist's Rendering of a Corner of the Parthenon in your *Art 21 Booklet of Reproductions*. Study it carefully and answer the following questions.

6. Does the addition of colour change the way you think of the building? Do you think colour is an improvement of the Parthenon? Why or why not?

Centuries later in 1687, the Turks, who were at war with the Venetians, used the Parthenon as an ammunition dump. During the battle, a cannonball ignited the ammunition and the Parthenon blew up. Had this unfortunate incident not occurred, the Parthenon would probably have survived as a complete temple.

7. Would you recommend that builders try to restore the Parthenon to its original state? Why or why not?

Check your answer(s) by turning to the Appendix, Section 2: Activity 2.

Activity 3: Civic Pride and Private Home: The Renaissance Palace

Understanding how the design of a building reflects its purpose.
Appreciate the ways a building reflects a community's values.

In the ancient world, civic pride and religious dedication were closely linked and expressed in the temple. During the Renaissance civic pride and public values came to be expressed not only in the public building, but also in the great home – the palazzo – of the civic leader. Florence was one of the first cities in which this new kind of private dwelling appeared. The rise of commerce and banking meant that great wealth could be amassed by an individual. Great individual wealth offered a family the means to build themselves a magnificent home that would enhance the family's reputation and bring honour to the city. A few of these palatial private homes still exist in Paris, New York, London, Rome, and Madrid. They are extreme versions of what we would call "mansions" – covering whole city blocks and incorporating vast rooms, gardens, and halls.

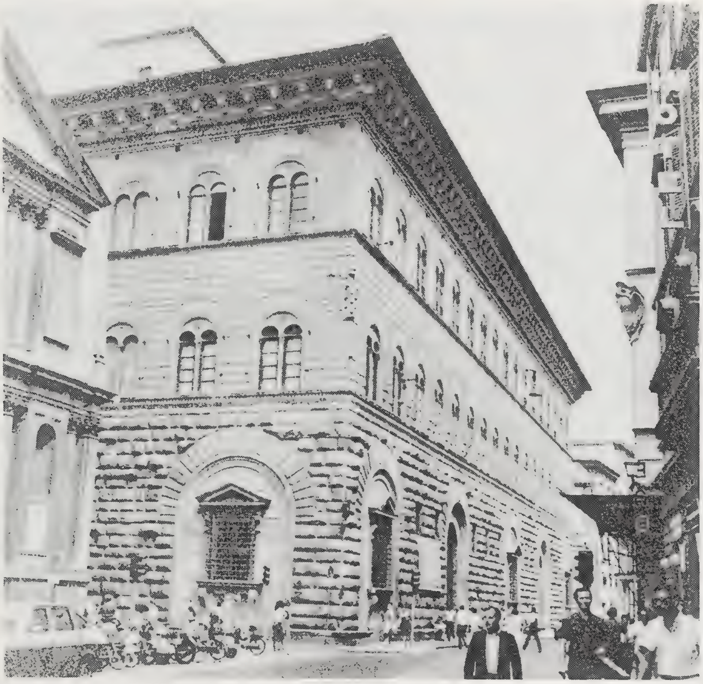


Illustration 233. Bartolommeo Di Michelozzo, 1396-1472, Italy. Medici-Riccardi Palace, Florence. ART Resource, N.Y.

The Medici Palace, built in Florence in the 1440s, shows how civic pride and public values can be expressed in the private home of a wealthy individual.

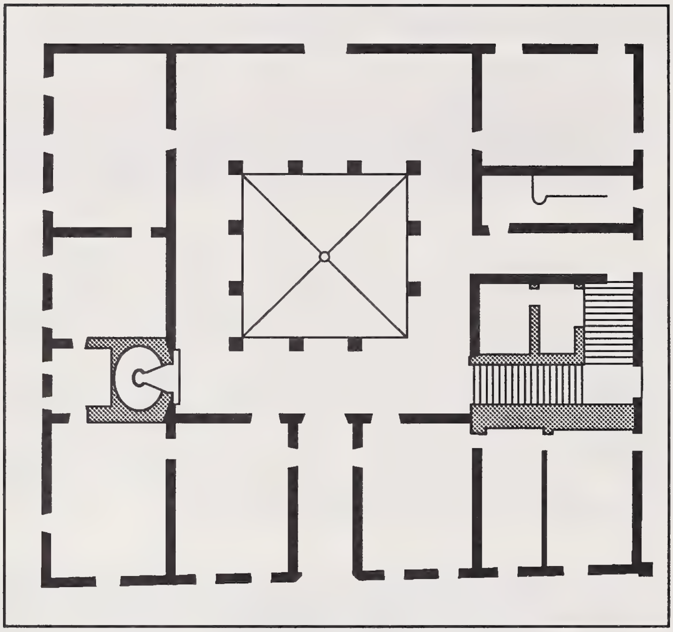


Illustration 234. Floor Plan. Ground floor of Medici Palace. Wolfe (Calvert) Paper.

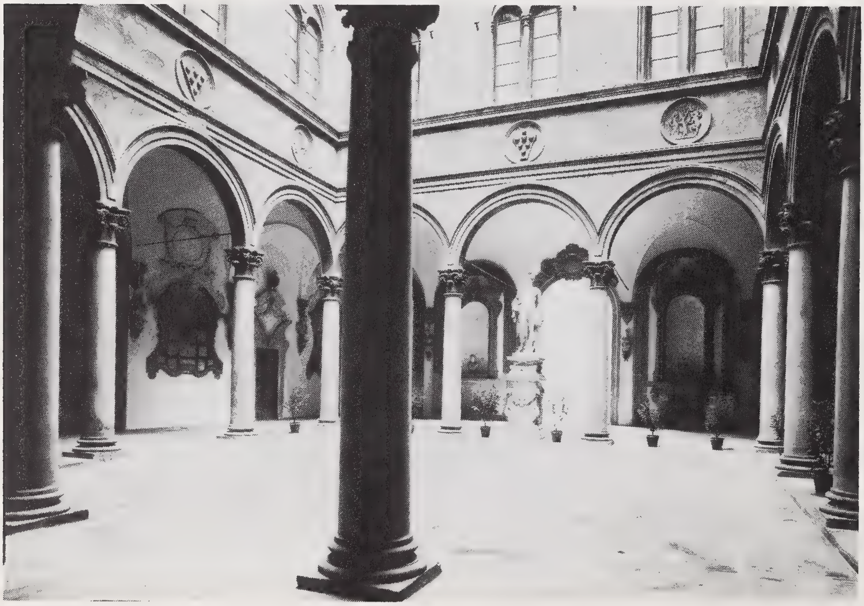


Illustration 235. Court of the Medici-Riccardi Palace or Medici Palace as it is often referenced. SCALA/ART Resource, N.Y.

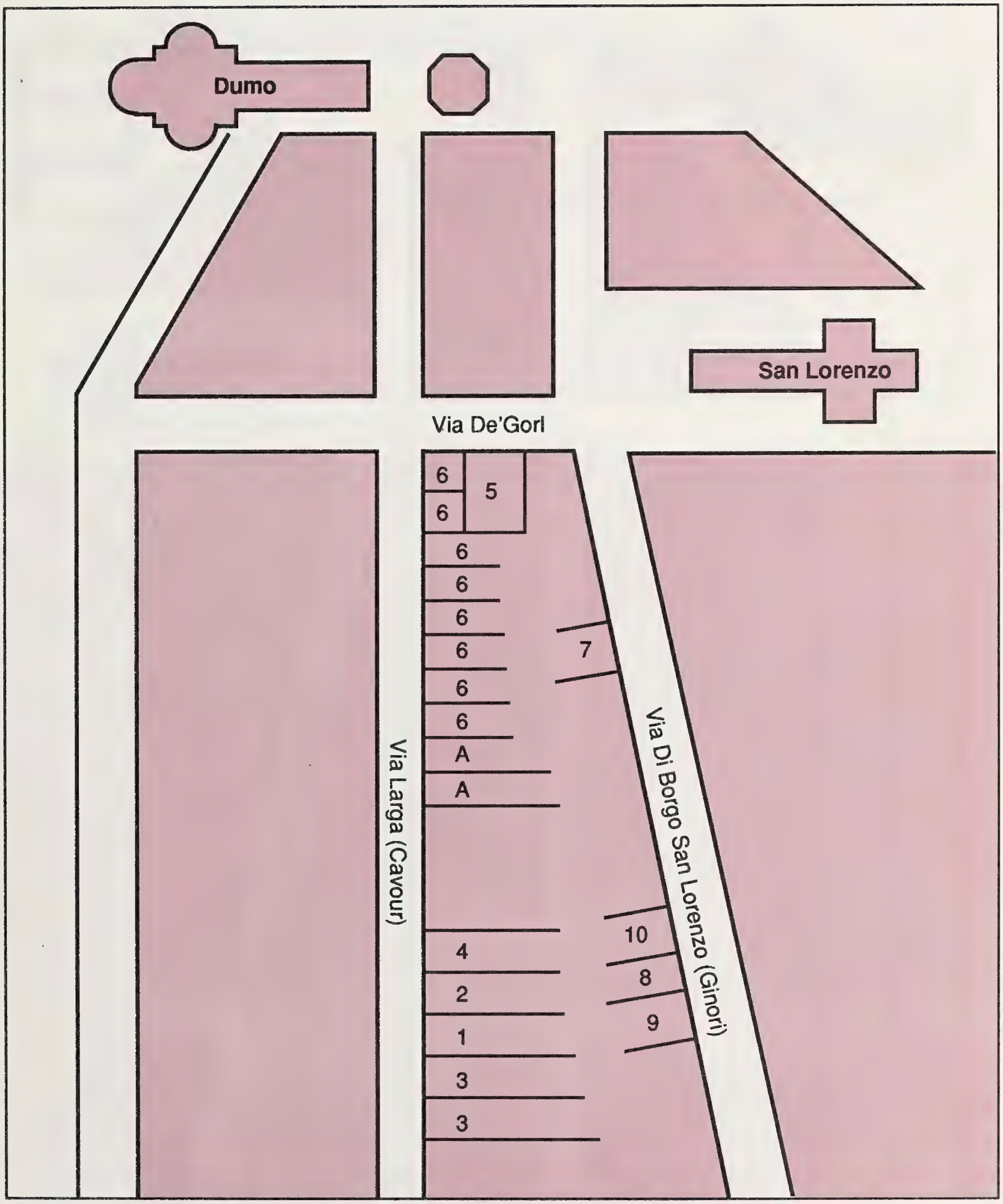


Illustration 236. Parish of San Lorenzo before completion of Palazzo Medici. Wolfe (Calvert) Paper.

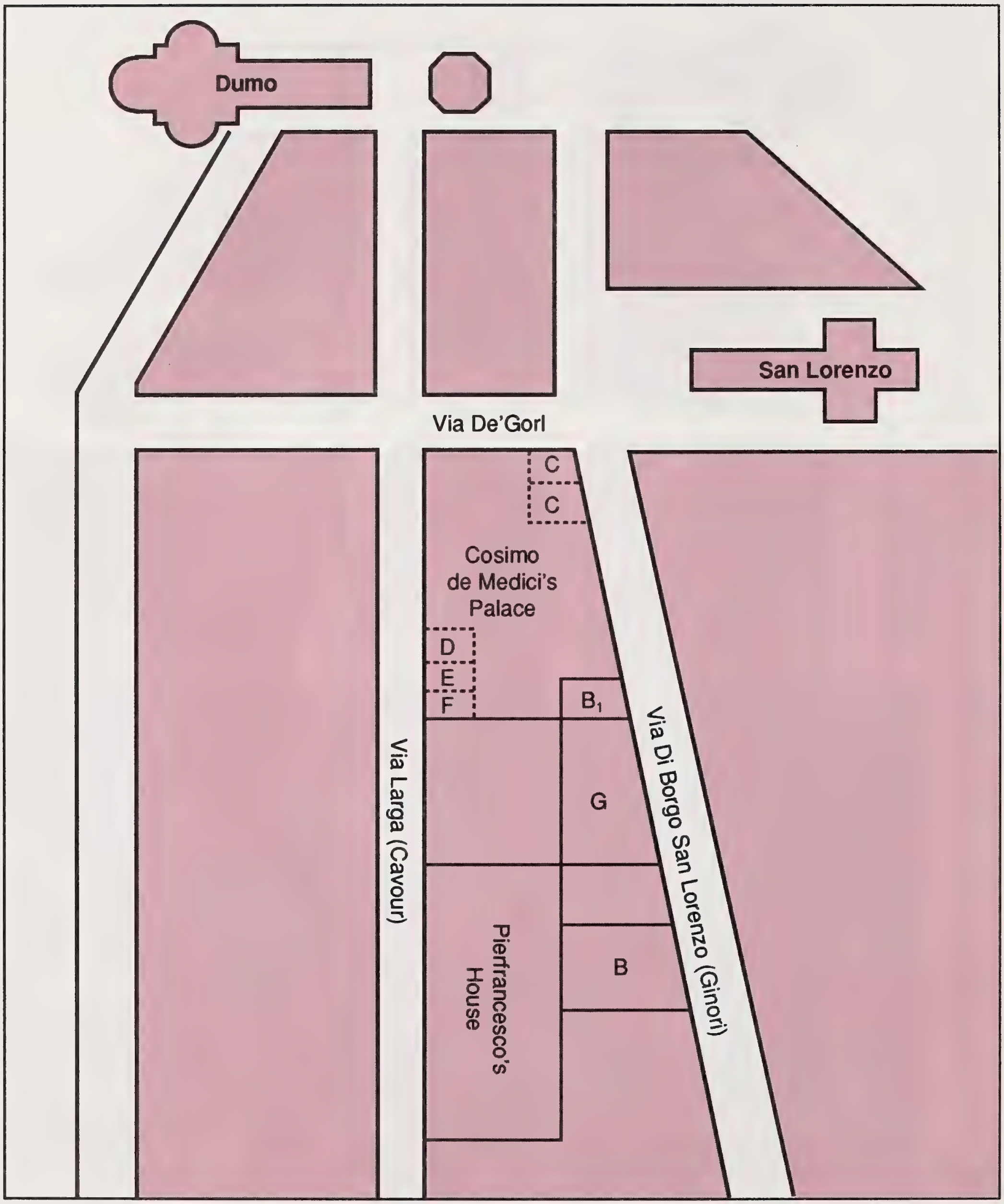


Illustration 237. Parish of San Lorenzo after completion of Palazzo Medici. Wolfe (Calvert) Paper.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 3598.

OR

Turn to page 177, Medici-Riccardi Palace, in your *Art 21 Booklet of Reproductions.*

1. Look again at the floor plan and the outside of the building as it is today. Use the people in the picture as your measure. Make a rough estimate of the height of the building. How does this compare with private homes of wealthy people today?

2. In what ways does the Medici Palace seem unlike a modern city home?

The Medici were bankers who reached princely status in fifteenth-century Florence. Over the next centuries their family eventually produced two queens for France, two popes, and numerous important historical figures in the church and politics of Europe.

3. Look at the picture of the exterior of the palace. Originally the first-floor windows that you see covered in the picture were open so that business could be conducted. Cosimo de Medici rejected an earlier design for his palace because it was "too ornate."* What do you think he wished to express in this building?

4. Look carefully at the maps of Florence, (Illustrations 236 and 237). One map shows the district before the Medici Palace was built, and one shows the district after construction of the Palace.

   a. What seems desirable about the location of the Medici Palace?

   b. Each numbered section on the street map before the Medici Palace was built represents a property. How many properties had to be eliminated in order to build the Medici home? Aside from their great wealth, why would the other leaders of the city allow the Medici to alter this city block so drastically? Include in your answer a statement about the civic values represented in this building.

   c. In ancient Greece, civic pride was expressed through the temple. Honouring the special god or goddess of the city, the temple was meant to benefit the people. In Renaissance Florence, in addition to public buildings, civic pride could be expressed through an individual home. How would you account for the difference? What changing beliefs and values might this change symbolize?

d. The Medici intended that their palace symbolize permanence, stability, and strength. What are the design qualities of the Medici Palace that communicate these characteristics?

Cosimo de Medici was the most powerful citizen in Florence in his time, but he was dealing with other citizens who were nervous about any one person seizing power over their city-state. It had only been a few decades since the nobility had been removed from power, and the Florentines did not want a new power figure to develop. One way they sought to prevent this was by controlling the way individuals used and displayed their wealth: buildings had to conform to height and size regulations, most of which Cosimo chose to ignore.

Religious beliefs were also a factor in the way things were done in Florence at that time. It was considered shocking to assume more grandeur than the church, and the palazzo that Cosimo was planning was certainly a competing structure, on a par with the fabulous churches and monasteries that were being built at the time. Both politically and in religious terms, Cosimo de Medici was on dangerous ground in building such a grandiose house. It is an indication of his real power in the community that he was able to propose such a project.

5. Imagine yourself an equally wealthy and powerful citizen of fifteenth-century Florence. Cosimo de Medici comes to you with his plan for the Medici Palace. Argue against it. Write your argument in the form of a dialogue.

Check your answer(s) by turning to the Appendix, Section 2: Activity 3.

Activity 4: Civic Values, Changing Technology, and Commerce: The Wainwright Building

Understand how the design of a building reflects its purpose.
Appreciate the ways a building reflects a community's values.
Recognize that changing cultures, new materials, and technology change architecture.

The values and civic pride of a modern city can be expressed through the buildings that are places of work: markets, banks, office buildings. Some nineteenth- and early twentieth-century architects designed public buildings that looked to the past. They used stone walls, Greek orders, domes, vaulted ceilings; others looked to the future and tried new materials and technology.

> A breakthrough in the evolution of the skyscraper occurred in 1890, when Louis Sullivan used a framework entirely of steel in this St. Louis office building known as the Wainwright Building. Its metal skeleton is clothed by brick piers, and the grid-like structure is suggested by the identical cellular window units on seven of the ten storeys.[1]

Now look at some images of the Wainwright Building.

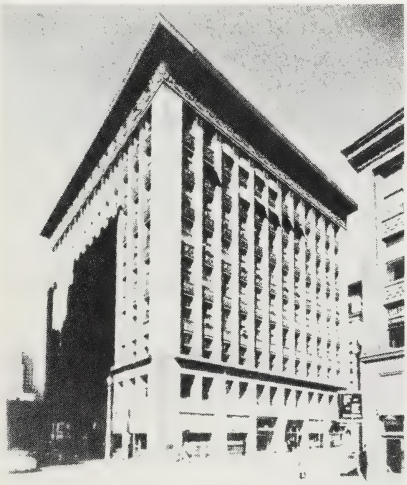


Illustration 238. Louis Sullivan. Wainwright Building, St. Louis, Missouri, 1890-91. Photo, Sandak Visual Documents in the Arts Program, G.K. Hall and Company.

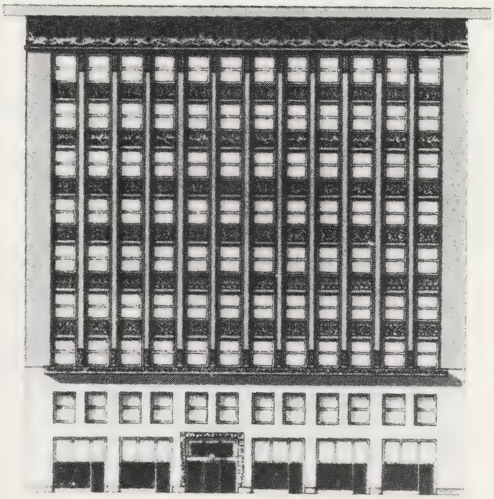


Illustration 239. Wainwright Building. From *Great Architecture of the World*, John Julius Norwich. Used with permission of Mitchell Beazley Publishers, London.

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[1] From *Great Architecture of the World*, John Julius Norwich. Used with permission of Mitchell Beazley Publishers, London.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 10186.

OR

Turn to picture 178, Louis Sullivan, Wainwright Building, in your *Art 21 Booklet of Reproductions.*

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 10185.

OR

Turn to picture 179, Louis Sullivan, Detail of Wainwright Building, in your *Art 21 Booklet of Reproductions.*

1. The Wainwright Building is an office tower built in 1890-91. Why do you think this building is often called the first modern building?

2. Compare the Wainwright Building to the Medici Palace. What major differences can you notice? Can you identify any similarities in design?

DIFFERENCES	**SIMILARITIES**

3. Read this paragraph, then answer the questions that follow.

> What many consider to be the first genuinely modern building was designed by Louis Sullivan and built between 1890 and 1891 in St. Louis. Known as the Wainwright Building, it employed a steel framework sheathed* in masonry.* Other architects had experimented with steel support but had carefully covered their structures in heavy stone so as to reflect traditional architectural forms and make the construction seem reliably sturdy. Centuries of precedent* had prepared the public to expect bigness to go hand in hand with heaviness. Sullivan broke new ground by making his sheathing light, letting the skin of his building echo, even celebrate, the steel framing underneath. Regular bays* of windows on the seven office floors are separated by strong vertical lines, and the four corners of the building are emphasized by vertical piers. The Wainwright Building's message is subtle but definite: the nation had stopped growing outward and started growing up.[1]

a. What did Louis Sullivan do that was really different?

____

____

____

b. Why did the architects of his time cover their steel-frame constructions with heavy material?

____

____

____

c. What is “modern” about the Wainwright Building?

____

____

____

d. Does the Wainwright Building seem up-to-date today? Why or why not?

____

____

____

____

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[1] Excerpt from *Living with Art*, 2nd edition, Rita Gilbert and William McCarter. Alfred A. Knopf Inc., 1988. Reproduced with the permission of McGraw-Hill Inc.

e. What seems the major advantage of the steel frame construction?

4. A new material has just been invented. Tougher and stronger than steel, this material comes in both rods and flat sheets and may be bent, moulded, or twisted into any shape. Once shaped, it holds under tremendous pressure. This new material, while extremely light and transparent, is amazingly durable. You have won the “experimental prize,” so a house of this material will be built for you. The project will make your town famous. Give the material a name.

   a. What changes in building design could such a material make possible?

   b. In question c. you are asked to design a building using this new material. What idea do you hope your building will express?

c. In the space provided prepare a sketch of a floor plan and a front elevation to show the architect.

Draw or paste your image here.

5. Using the knowledge you have gained from studying this section, write five questions that you will need to ask the architect before the plans are drawn.

6. Now write five questions that the architect will have to ask you before the plans for your house are final.

7. Think of three questions the mayor of your town or your neighbour might ask when they learn you are going to build an experimental house.

Check your answer(s) by turning to the Appendix, Section 2: Activity 4.

Activity 5: Gathering Places: Images and Technology

Recognize a significant landmark of architecture.
Understanding how the design of a building reflects its purpose.
Appreciate the ways a building reflects a community's values.

From ancient times until now, people have built great gathering places where a community can assemble for sports events, for concerts, for conventions, for celebrations, for shopping. The design and the size of such places can tell something about the way a society values the activity.

A twentieth-century building that makes a powerful statement about the city, its people, and its purpose is the Sydney Opera House in Sydney, Australia.

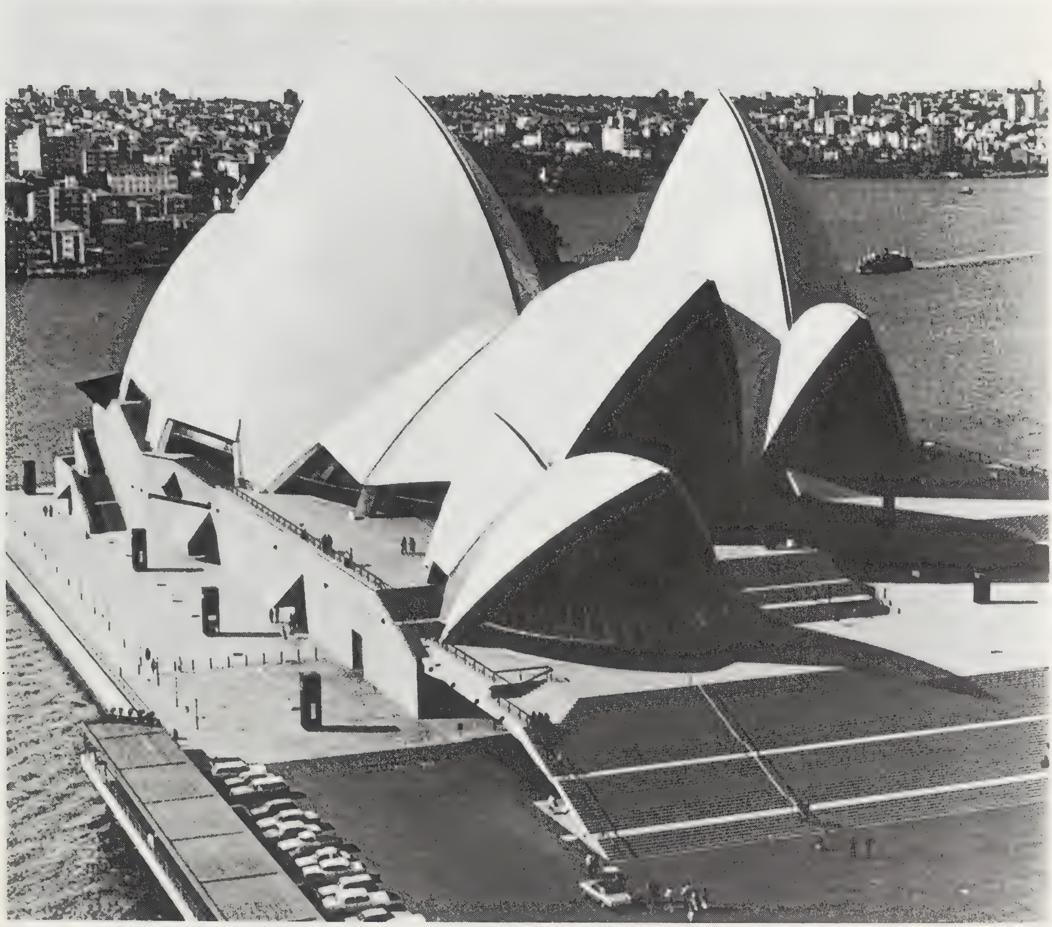
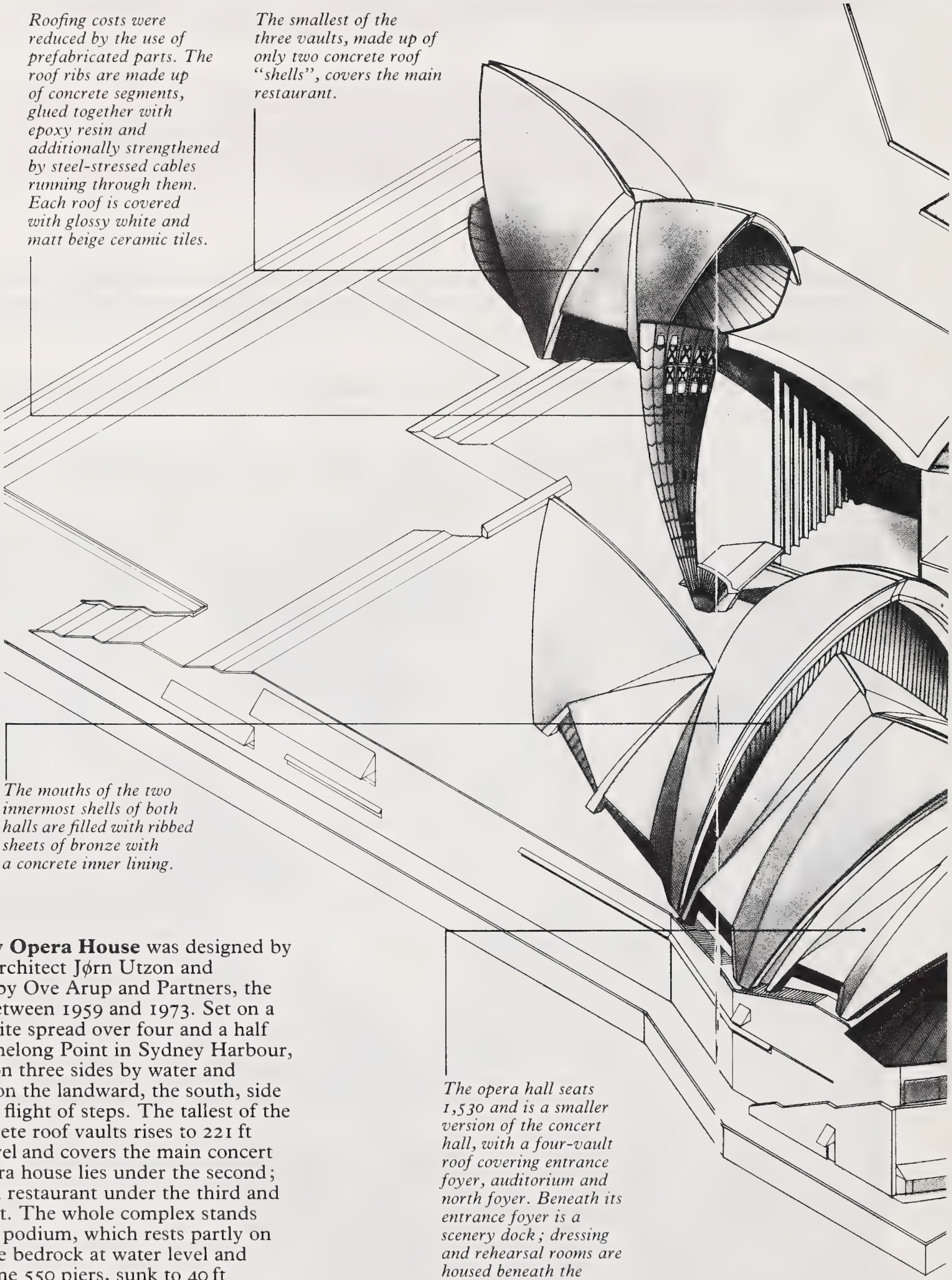


Illustration 240. Sydney Opera House. Courtesy Australian Tourist Commission.



Roofing costs were reduced by the use of prefabricated parts. The roof ribs are made up of concrete segments, glued together with epoxy resin and additionally strengthened by steel-stressed cables running through them. Each roof is covered with glossy white and matt beige ceramic tiles.

The smallest of the three vaults, made up of only two concrete roof "shells", covers the main restaurant.

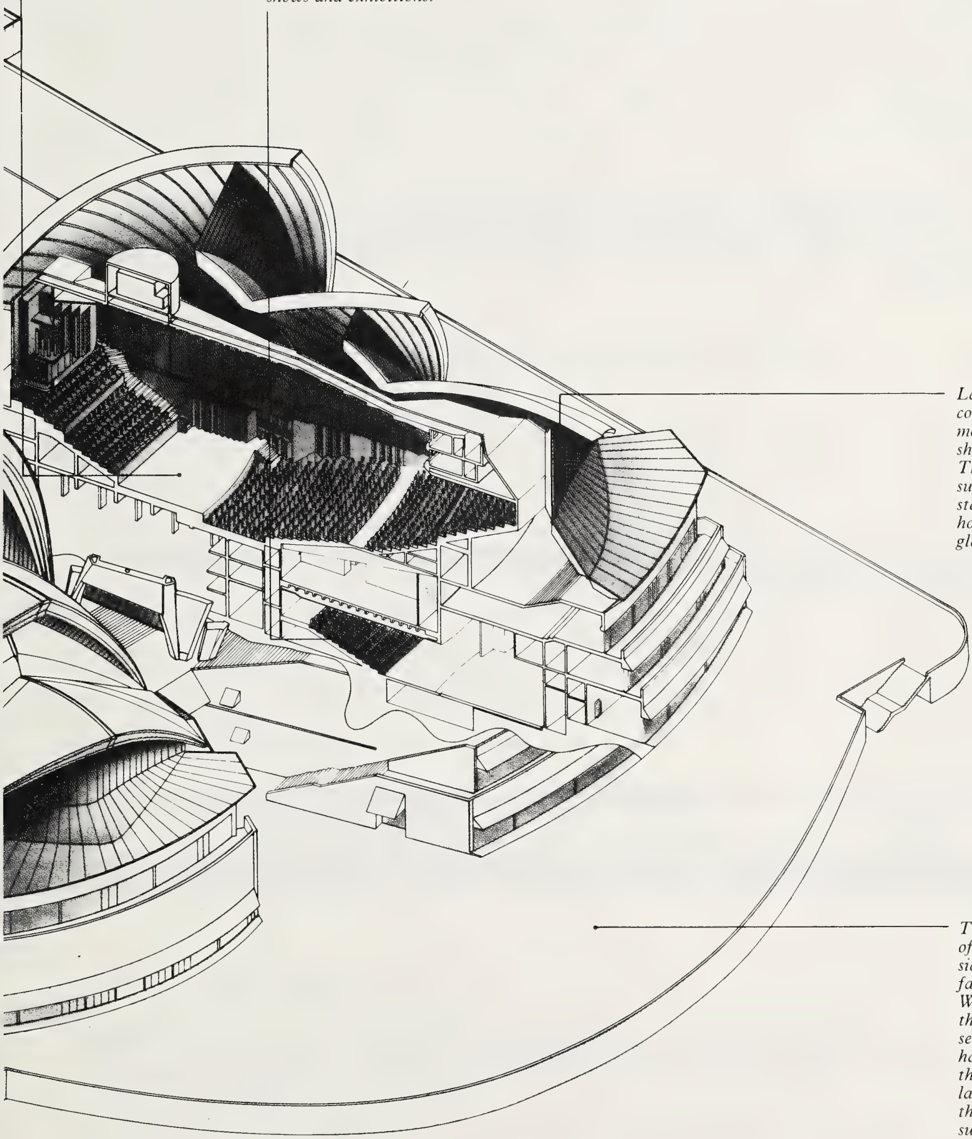
The mouths of the two innermost shells of both halls are filled with ribbed sheets of bronze with a concrete inner lining.

The opera hall seats 1,530 and is a smaller version of the concert hall, with a four-vault roof covering entrance foyer, auditorium and north foyer. Beneath its entrance foyer is a scenery dock; dressing and rehearsal rooms are housed beneath the revolving stage.

The Sydney Opera House was designed by the Danish architect Jørn Utzon and constructed by Ove Arup and Partners, the engineers, between 1959 and 1973. Set on a spectacular site spread over four and a half acres of Bennelong Point in Sydney Harbour, it is skirted on three sides by water and approached on the landward, the south, side by a gigantic flight of steps. The tallest of the curved concrete roof vaults rises to 221 ft above sea-level and covers the main concert hall; the opera house lies under the second; and the main restaurant under the third and smallest vault. The whole complex stands on a massive podium, which rests partly on the sandstone bedrock at water level and partly on some 550 piers, sunk to 40 ft below sea-level in some places.

The concert hall, the largest of the structures, seats 2,700. The four-vault roof system covers an entrance foyer, the stage and auditorium, and a north foyer, which overlooks the harbour. Inside, white birch plywood lines the walls and ceiling.

Beneath the north foyer of the concert hall is a separate drama theatre, seating 550, which has its own entrance foyer. A mezzanine space between the drama theatre and the concert hall contains a rehearsal area measuring 3,600 sq ft. Beneath the concert hall's south foyer is space equipped for chamber concerts, film shows and exhibitions.



Laminated, amber-coloured glass covers the mouths of the outermost shells of both halls. These glass curtains are supported by vertical steel mullions and horizontal bronze glazing bars.

The vast podium is made of concrete, its top and sides clad in granite-faced concrete slabs. Within the podium lie the stages and lower seating of the main halls and the subsidiary theatres. At the landward end, behind the opera hall, is a huge sunken vehicle concourse.

Illustration 241. Cut-away diagram of the Sydney Opera House. Adapted from *Great Architecture of the World*, John Julius Norwich. 1975 Random House Inc. in association with American Heritage Publishing Co. Inc., New York. Reproduced with the permission of Mitchell Beazley Publishers, London.

Carefully study the previous Illustrations and view picture 180, Sydney Opera House, in your *Art 21 Booklet of Reproductions*, then answer the following questions.

1. The Sydney Opera House is a monument to culture. A competition was held in 1957 for the design of the new opera house, and this design by Jorn Utzon won. What does the choice of design tell you about the city?

2. The Opera House is built of concrete reinforced by iron rods and steel mesh. Reinforced concrete is both light and strong. Another advantage of this material is that it may be moulded into exciting shapes. Why is reinforced concrete an ideal choice of building material for the Sydney Opera House?

3. The Opera House was intended to symbolize the great port city of Sydney. What design elements support this symbolism?

4. Look carefully at the images of the Sydney Opera House that accompany this section. List at least five unusual design features that are completely different from the other buildings you have studied.

Study the cut-away drawing from *Great Architecture of the World* (Illustration 241) and read the notes that accompany the drawing.

5. Some of the citizens of Sydney did not like the building. They found the sail-like roofs were not functional and complained there was no place to park. How would you reply to these objections?

6. What do you think the Sydney Opera House adds to the life of the city?

Check your answer(s) by turning to the Appendix, Section 2: Activity 5.

Follow-Up Activities

If you had difficulty understanding the concepts in the activities of this section, it is recommended that you do the Extra Help. If you have a clear understanding of the concepts it is recommended that you do the Enrichment.

Extra Help: An Illustrated Dictionary

Review the section. Make an illustrated dictionary of the following terms. Write a simple, clear definition, make a simple black and white drawing to illustrate the term, and give an example of its use in a building.

- Pediment
- Doric Order
- Cornice
- Skeleton and Skin Construction
- Architrave

Check your answer(s) by turning to the Appendix, Section 2: Extra Help.

Enrichment: Be Convincing

One of Alberta's most famous gathering places is the West Edmonton Mall. Write to the Edmonton Tourist Bureau requesting some information about the mall. Use the information you gather to convince your Australian cousin that a visit to the mall is not-to-be-missed. Include a statement about the mall as an expression of civic values.

Check your answer(s) by turning to the Appendix, Section 2: Enrichment.

Conclusion

In this section you have studied some examples of buildings that reflect a society's values. You have noticed how a building's details, design, ornament, and materials help to express purpose and function. From the examples you have learned that buildings have meaning, and from exploring how and why a building was made you can begin to discover that meaning.

Assignment Booklet

Turn to your Assignment Booklet and do the assignment(s) for this section.

SECTION 3

ROMANESQUE ARCHITECTURE

Each year on Elvis Presley's birthday, thousands of his loyal fans travel to Graceland, his estate in Memphis where he died in 1977. His admirers appear to believe that by going to the place of his death they can somehow relive the experience of being touched by the power of his music. It seems that these enthusiastic followers also are deeply moved by being in the actual physical space of his home, the place where he lived and died. The most committed of his fans will pay thousands of dollars for a souvenir of that visit, particularly if that souvenir is something that belonged to the singer – a jacket, a tool, a piece of music. This desire to share in the power of someone thought great seems to be a common human impulse.

Do you have any heroes or heroines that you greatly admire? Is there a rock star, or an athlete, or a statesman, or a leader in any field that you would try to see or touch? Do you have any banners, pins, signs, or badges, that show that you have visited some special place or that you belong to some special group? If you have models that you admire, if you have such remembrances of travels, then you will be able to understand how almost 1000 years ago journeys to special places to honour great men and women created a need for many new churches, and these churches in turn became symbols of a changing world.

At the end of this section you will be able to

- understand the significance of relics* in Medieval Christianity
- discuss the impact of pilgrimages* on the design of the Romanesque* Church
- connect the symbolism of a Romanesque church to its design
- recognize the role of Romanesque architecture in shaping Christendom
- recreate in imagination the pilgrims' journeys

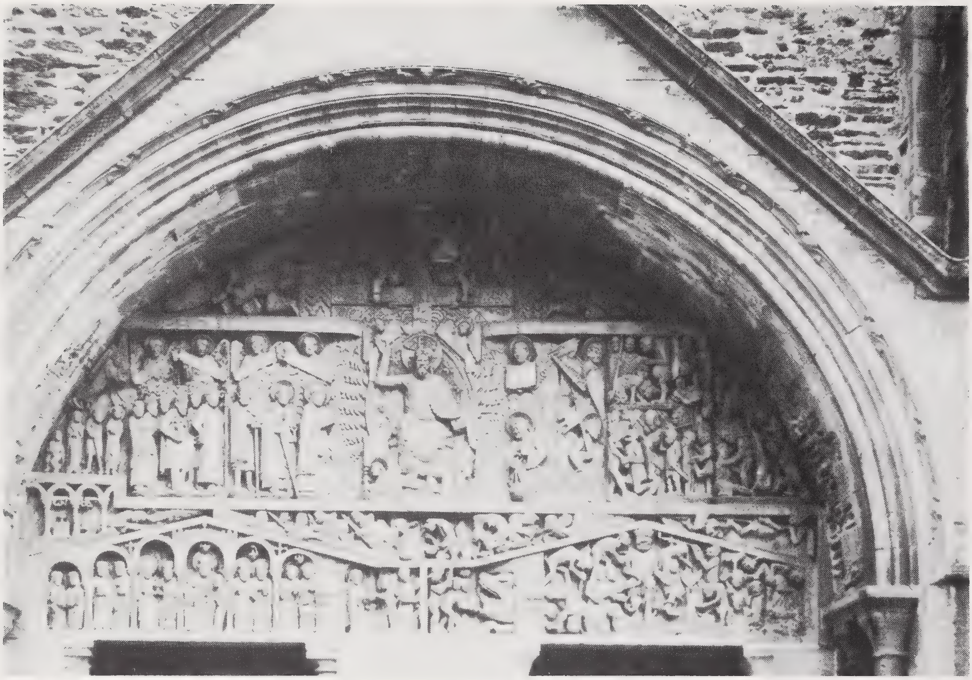


Illustration 242. Church of Ste. Foy, Conques. *Last Judgement.* SCALA/ART Resource, N.Y.

During the late Middle Ages, roughly 1050 to 1450, there was a new and hopeful spirit in society. The millennium,* the year 1000, had come, and the world had not ended as expected and predicted by some. The Norsemen had settled down, and life generally took a turn for the better. In spite of the new hope, there were great natural disasters: floods, storms, cold winters; and man-made disasters: wars, fights, and plunder.* Because nature was largely unexplained, the uneducated medieval person trusted to God and to the saints for protection against every real and imagined evil. The practice of medicine was somewhat primitive by our standards and the natural causes of sicknesses were unknown. If you were ill and became well, your recovery could be attributed to prayer and to the intervention* of a saint. Many medieval Christians thought of the saints as heroes and heroines who were extraordinary examples of goodness in life, and who exercised extraordinary influence with God after death. Popular religion made much of the practice of visiting the shrines of the saints and of collecting souvenirs of such visits. The monastic* Churches, stopping places for the travellers, were both shelter and symbol. Those who journeyed long distances to a sacred place as an act of devotion were called pilgrims, and their journey was called a pilgrimage.

Activity 1: The Pilgrims

Recreate the pilgrims' journeys.

Study the following map of the pilgrims' journeys.

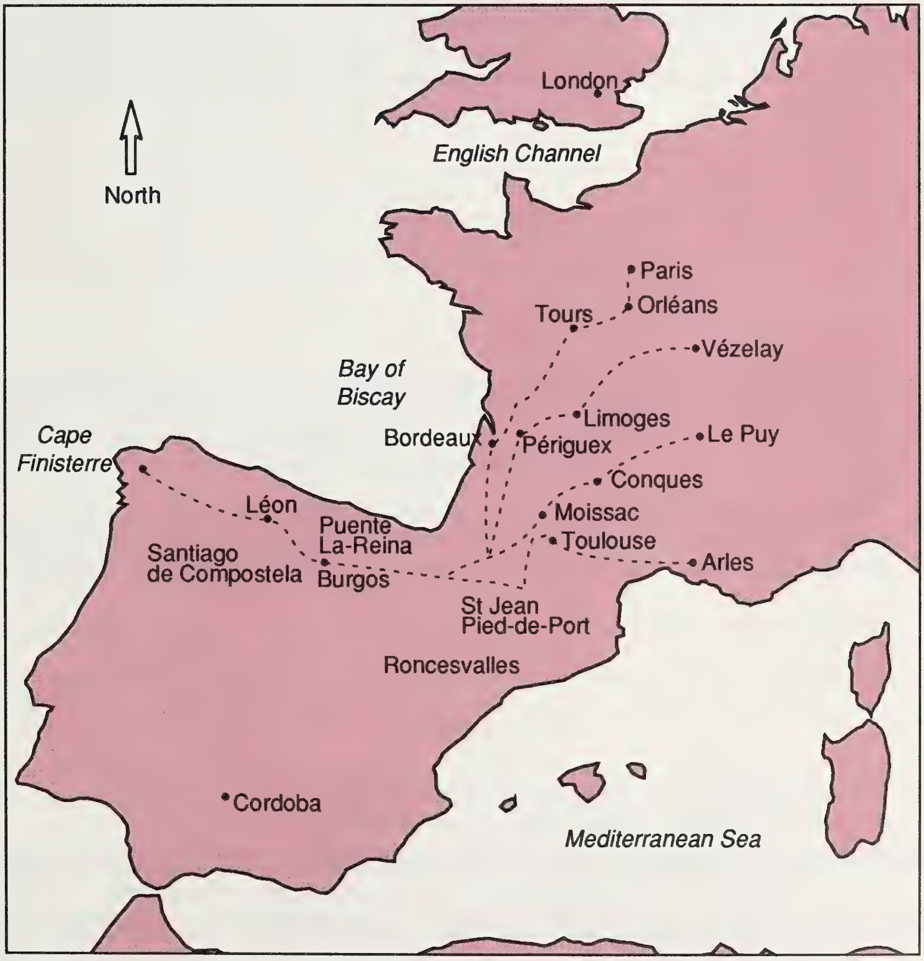


Illustration 243. Pilgrimage routes to Santiago de Compostela. Adapted from *A History of Architecture: Settings and Rituals* by Spiro Kostof. Copyright © 1985 by Oxford University Press, Inc. Reprinted by permission.

1. Where is the final southwest destination of the pilgrims?

2. List the possible starting points for the journey beginning in the north and northeast.

3. Select one starting point and name all the way stations you would pass through as you travelled southwest.

4. Where do many of the routes connect?

5. In the high years of pilgrimage, as many as 1200 to 1500 people would be in a group travelling south. Some years, as many as 500 000 people would pass through a village on a pilgrimage route. What effect do you think this would have on the villages they passed through?

6. Travel was on foot or on horseback. Both the rich and the poor went on pilgrimage. List as many needs of the travellers on their route as you can think of.

7. What benefits to the towns and the villages might result because of the pilgrimage traffic?

8. The main purpose of the pilgrimage was to honour God by showing honour to a saint. The remains of the saints, the holy men and women who either died for their faith as martyrs, or who lived exemplary lives, were highly valued. Churches were eager to have the whole or a part of the body of the saint or to have some item that the saint used or wore. Such remains are called relics. Why would relics be so valuable?

9. The pilgrims were making an act of devotion* and so were protected by church and civil law. They were housed, fed, and exempt from the toll-tax on the bridges and the highways. They were expected to make contributions wherever they stayed. What contributions might a wealthy Christian make? What contribution might a poor person make?

Check your answer(s) by turning to the Appendix, Section 3: Activity 1.

Activity 2: The Romanesque Church

Understand the significance of relics in Medieval Christianity. Understand the impact of pilgrimages on the design of the Romanesque Church. Connect the symbolism of a Romanesque Church to its design. Recognize the role of Romanesque architecture in shaping Christendom.

Life on the road was hard for the pilgrims; nevertheless, they made as joyous a trip as possible. Singing, dancing, telling stories – they were not unlike a group of modern tourists.

1. List some of the building considerations that would have to be taken into account to allow this sometimes boisterous* group to visit the shrine of the saint.

The traffic in pilgrims created an increase in the building of hospices* and other shelters for the travellers. The monasteries considered the care of travellers a sacred duty. Frequently the hospices were attached to the monasteries,* and so the gifts of land and money and the donations in work made it possible for the monks to build the pilgrim churches that housed the relics of the saint.

Look at the pilgrimage map again. Find Conques. At Conques, the monks built a church in honour of Saint Foy (Faith) a young girl who was martyred for her faith. The body of the saint was contained in a richly decorated gold figure which could be shown to the people on special feast days.

2. Why do you think that Ste. Foy Church became a significant stop on the way to Santiago?

Study the pictures of the church of Ste. Foy as it looks today.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frames 3862, 3864, and 6568 to 6572.

OR

Turn to pictures 181 to 187, Abbatial Church of Ste. Foy, in your *Art 21 Booklet of Reproductions.*

Built between 1050 and 1130 during the great age of pilgrimage, the church has all the essential features of a pilgrimage church.

3. What do you think these essential features might be?

Note some of the details of the church: two side aisles, a nave, a transept; both side aisles lead around the altar to the five chapels. The church has two major entrances.

Check your answer(s) by turning to the Appendix, Section 3: Activity 2.

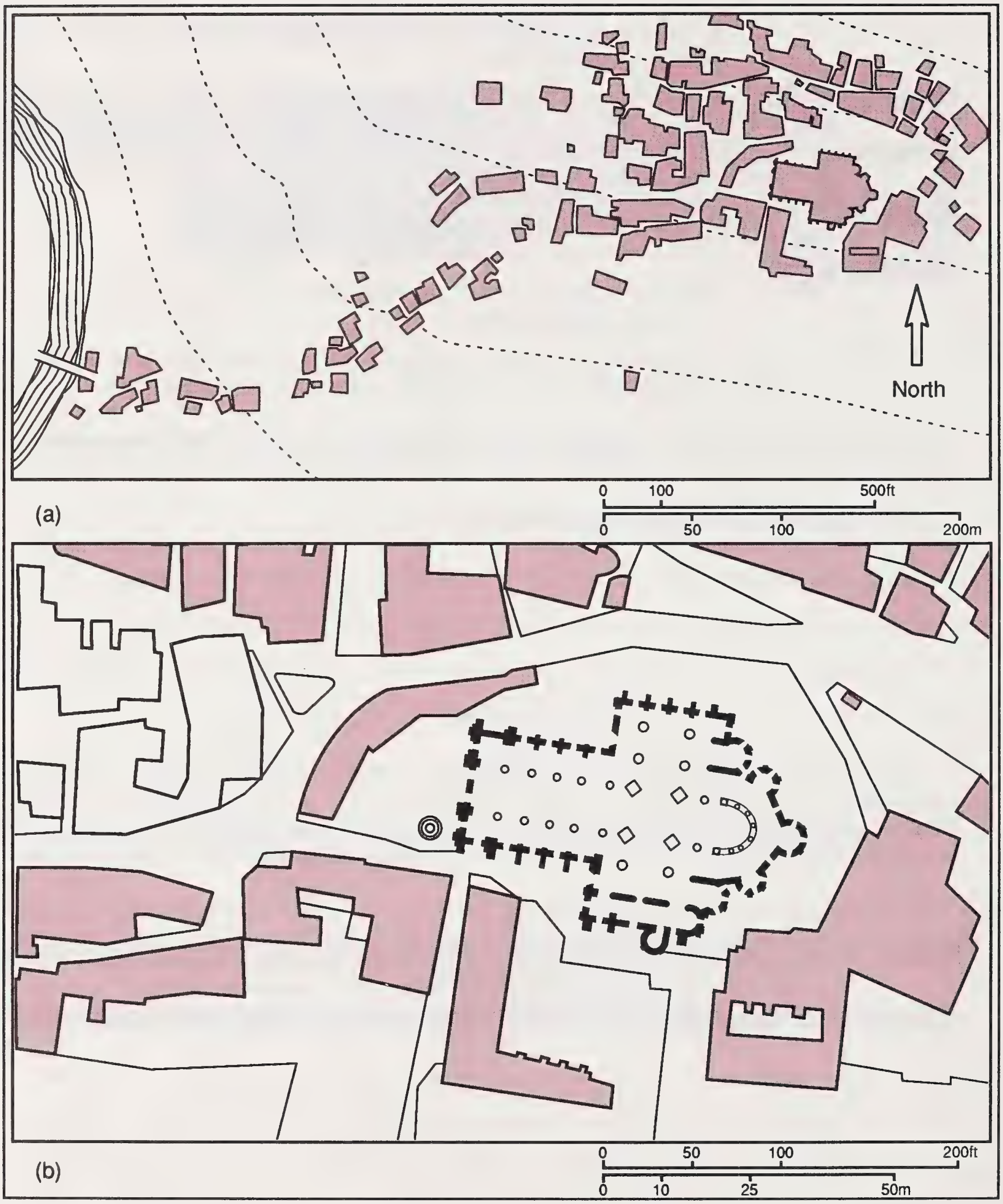


Illustration 244. a. Map of Ste. Foy area. b. Plan of Ste. Foy Church. From *A History of Architecture: Settings and Rituals* by Spiro Kostof. Copyright © 1985 Oxford University Press, Inc. Reprinted by permission.

4. This church was built completely of stone. What is the great advantage of this material?

5. Look at the interior of the church of Ste. Foy. Use your knowledge of structural systems to describe the method of achieving height and stability.

6. Look carefully at the columns and the capitals. How are these different from the Greek orders you studied in Section 2 of this Module.

Check your answer(s) by turning to the Appendix, Section 3: Activity 2.

A medieval Christian church was planned on the design of the Latin cross. Here is an example of a cross-shape church with some of the parts labelled. (A definition of these terms follows.)

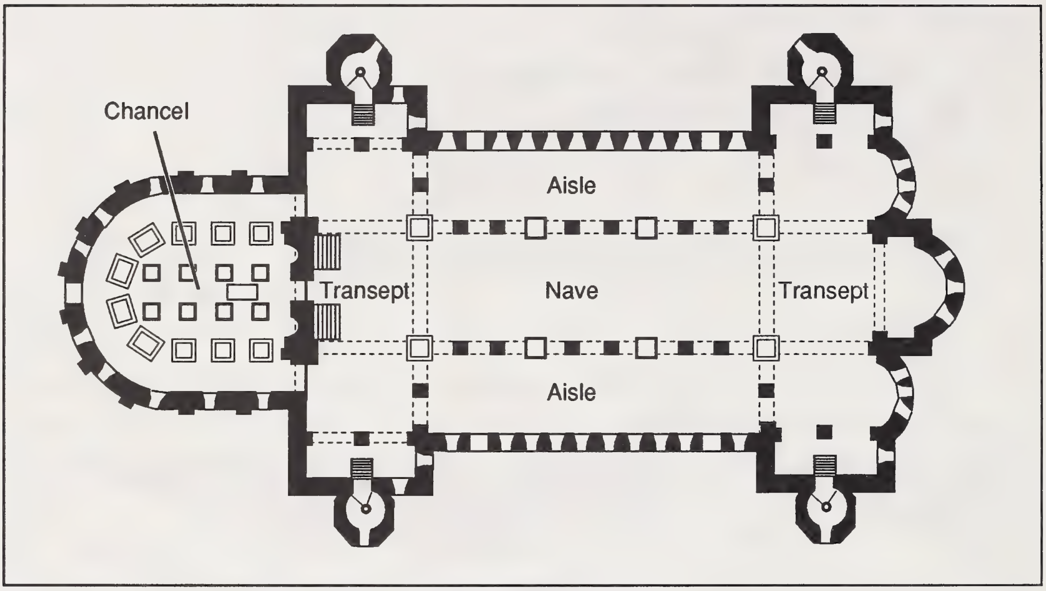


Illustration 245. Plan of a medieval Christian church.

Nave	• the central part of a Christian church
Aisles	• the parts of a church parallel to the nave, but separated from it by piers
Transept	• the part of the church that crosses the nave at right angles
Chancel	• the part of a Christian church that contains the altar and choir

Now study the floor plan of the Church of Ste. Foy at Conques, Illustration 244b.

7. Mark the location of nave, aisles, and chancel in the Church of Ste. Foy. Write a brief paragraph to highlight the differences between the church of Ste. Foy and the Christian church shown in the floor plan in Illustration 246.

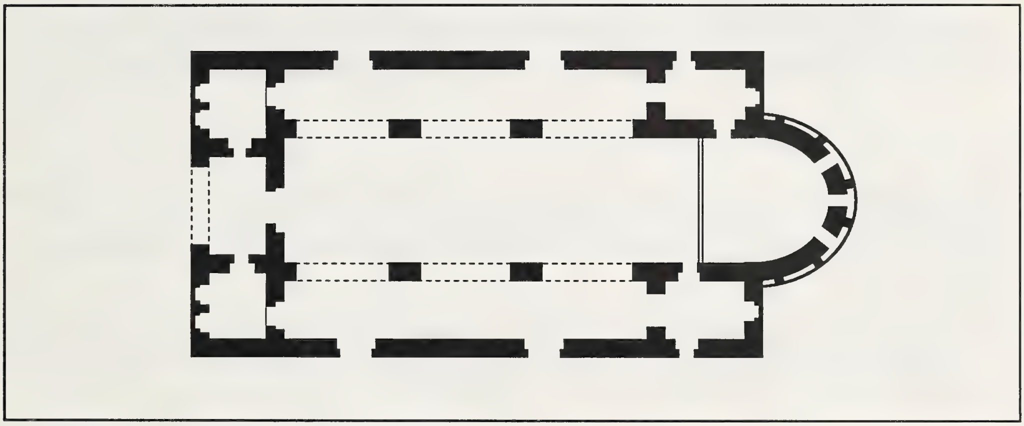


Illustration 246. Floor plan of Christian church.

8. The pilgrimage plan and design is called Romanesque, because of the round arch and the thick walls. Why do the walls at Saint Foy seem light? How do you think this church was lighted?

The Romanesque Church at Conques, Ste. Foy, was built both to be a way-station on the pilgrimage route and a shrine. Pilgrims came to venerate* the young martyr and to ask for favours and for healing. The design of the church has this practical purpose, but it has also a symbolic function that helped shape the Christian religion.

9. Look carefully at all the images and the plan, consider the horizontal direction and the vertical direction now as symbols of the Christian faith. What does this church say to the pilgrims through its architecture, through its spaces, and design details.

Check your answer(s) by turning to the Appendix, Section 3: Activity 2.

Follow-Up Activity

The following is an enrichment activity that you may select to do.

You have successfully experimented with time-travel and find yourself in the village of Arles in the south of France in April, 1185. You land in the midst of a throng of pilgrims just starting out on the road to Compostela. By a stroke of good fortune you have your camera and a roll of film with 12 exposures. You complete the pilgrimage as far as Conques before returning to Canada and to the twentieth century. Describe and explain the significance of the 12 pictures you will take. (You may sketch if you like.)

Check your answer(s) by turning to the Appendix, Section 3: Follow-Up Activity.

Conclusion

In this section you learned how a cultural experience, the pilgrimage, helped shape the architecture of the Romanesque church.

Assignment Booklet

Turn to your Assignment Booklet and do the assignment(s) for this section.

SECTION 4

THE GOTHIC CATHEDRAL AND THE MYSTICISM OF LIGHT

Flames burst out from the letter "C" to symbolize the Calgary Flames; a galloping horse is the chosen symbol of the Saskatchewan Roughriders; the wild rose is part of the official emblem* of Alberta: all these symbols are special ways of communicating. A word or an image becomes a symbol where it implies something more than what it is. Think of a wheel, for example. A wheel can mean just what it is – a circular frame that revolves on an axis, so you can speak of the bicycle wheel, the cart wheel, and the wheel of the car. If you wish to use the wheel as a symbol, you have to think about its appearance and about its special properties so that you can use the image of the wheel to communicate ideas perhaps of changing fortune, or of power, or of supernatural events. You can speak of "the wheel of fortune," of a powerful person as "a big wheel," or of heavenly forces as a "wheel of fire."

The sun, water, fire, precious jewels, certain colours, gold, and silver are often used as symbols for uncommon ideas. What connection does symbol-making have with architecture? In this section you will learn how the building of the Gothic cathedral expressed the symbolism of light and how the passion for light and colour brought a significant change to church buildings and design.

After completing this section you will be able to

- discuss the reasons for the differences between Romanesque and Gothic churches
- understand the connection between the symbolism of light and the building of the Gothic cathedral
- recognize the teaching function of stained glass windows
- appreciate the structure and role of the medieval guilds

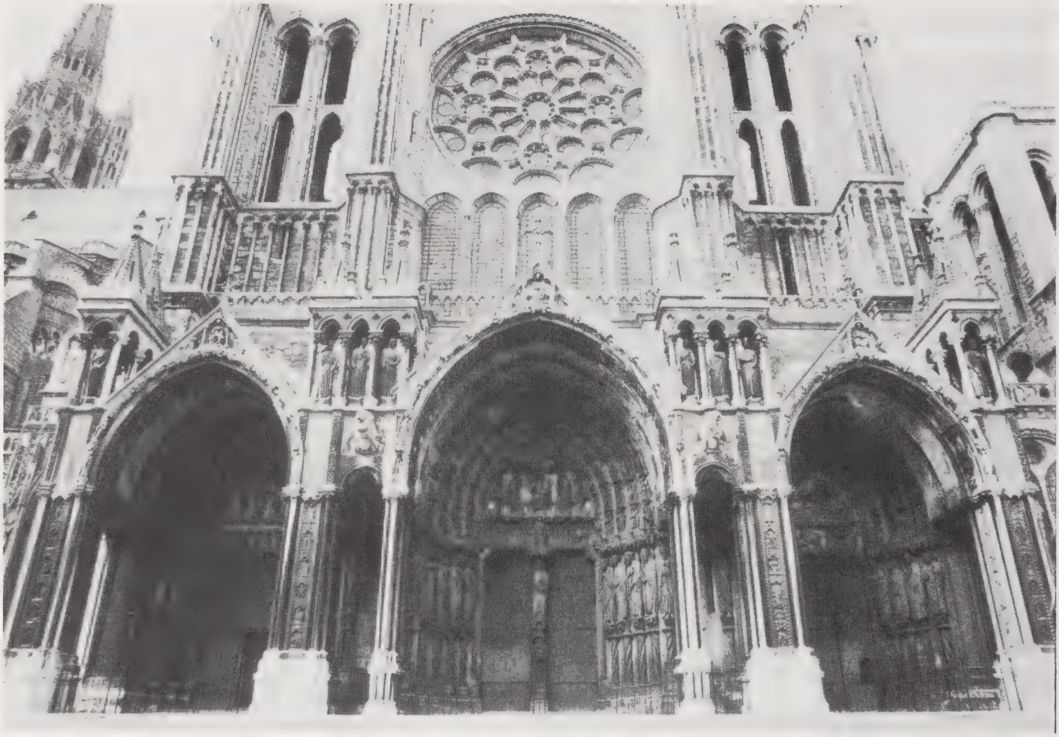


Illustration 247. Chartres Cathedral, The South Porch, 1194-1245. France. ART Resource, N.Y.

During the later Middle Ages, roughly 1050 to 1400, analogical* thinking was encouraged. Making connections between the appearances of things and their deeper meanings was a way of using the natural world as a "book." Learners were taught to meditate on the appearances and properties of things, and then connect these to higher truths. At a time when the visible suggested the invisible, the building of a church was as much a symbolic as a practical event.

You learned in the previous section that the Romanesque church reflected the devotional needs of the pilgrims. These churches were somewhat international. By the end of the twelfth century, kings were beginning to wish for churches that would become statements of national pride. One such king was Louis VII of France. His leading statesman was the Abbot of St. Denis, Suger. The Abbot Suger, generally credited with the founding of the Gothic style, was a true medieval man in that he looked for, and found, correspondences between nature or precious objects and divine truths. In the activities that follow you will learn how the Gothic cathedral helped shape Christendom. The Abbey* of St. Denis, Suger's home abbey, was for centuries the burial place of the kings of France.

Activity 1: The Mysticism of Light

Understand the connection between the symbolism of light and the building of the Gothic cathedral.

1. The following chart lists some natural objects that are frequently used as symbols. For each, mention some characteristics, then suggest what the object might symbolize. An example has been done to get you started.

	CHARACTERISTICS	POSSIBLE SYMBOL
FIRE	heat, light	war, love, power, energy
WATER		
ROCK		
MOON		
DANDELION		

Was it difficult for you to make a connection between each object and its function as a symbol? Here is a meditation of Abbot Suger which will help you discover how medival analogical* thinking works. Read the passage carefully and answer the questions that follow.

> When – out of my delight in the beauty of the house of God – the loveliness of the many-colored gems has called me away from external cares, and worthy meditation has induced me to reflect, transferring that which is material to that which is immaterial, on the diversity of the sacred virtues: then it seems to me that I see myself dwelling, as it were, in some strange region of the universe which neither exists entirely in the slime of the earth nor entirely in the purity of Heaven; and that, by the grace of God, I can be transported from this inferior to that higher world in an analogical manner.[1]

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[1] From A History of Architecture: Settings and Rituals by Spiro Kostof. Copyright © 1985 by Oxford University Press, Inc. Reprinted by permission.

2. a. What material objects inspire the Abbot to think about heavenly things?

   b. What connection is the Abbot making between matter and spirit?

3. The Abbot Suger believed that churches should be as rich in colour, light, gold, and gems as possible. What effect do you think he believed this would have on the worshippers?

Check your answer(s) by turning to the Appendix, Section 4: Activity 1.

Activity 2: Chartres Cathedral

Understand the reasons for the differences between Romanesque and Gothic churches. Recognize the teaching function of stained glass windows.

One of the great Gothic cathedrals is the Cathedral of Notre Dame in Chartres, France. In this activity you will learn about the design of a Gothic cathedral and how this design was related to its purpose: to teach and to glorify God and the state.

A chief difference between places like Ste. Foy and Notre Dame de Chartres is that the former was a church of a cloistered, or secluded, community of monks, while the latter was a teaching church for the community of people who lived in Chartres.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frames, 3850, 6518, 6520, and 6521.

OR

Turn to pictures 188 to 192, *Notre-Dame Cathedral, Chartres*, in your *Art 21 Booklet of Reproductions.*

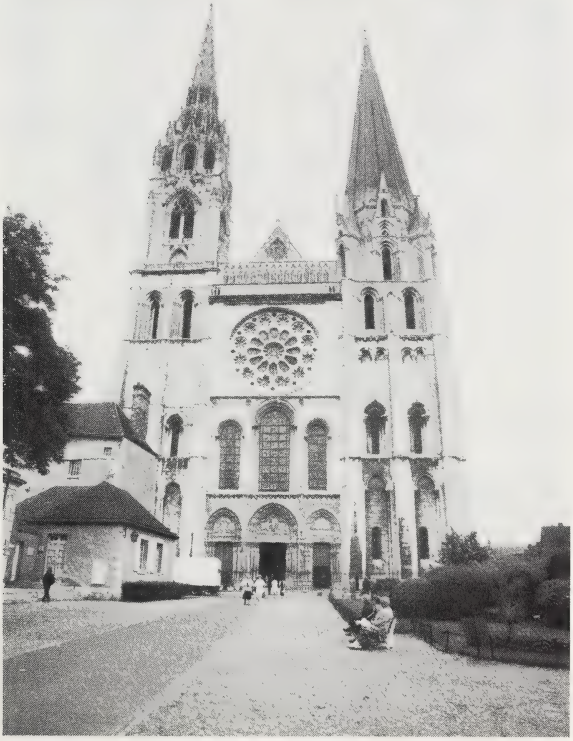

Illustration 248. Chartres Cathedral, Facade, 1194-1240. ART Resource, N.Y.

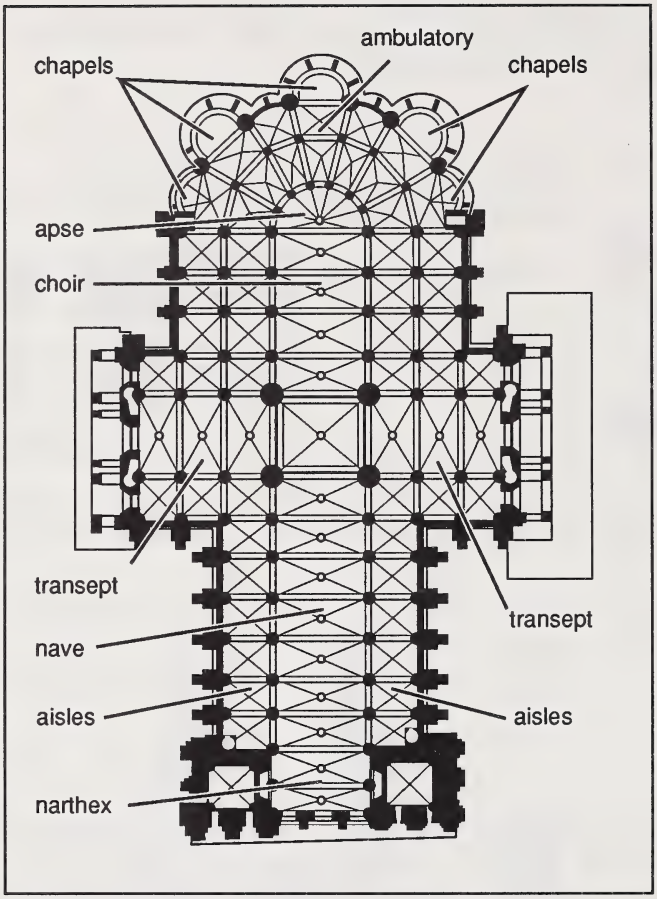

Illustration 249. Floor Plan of Chartres Cathedral.

1. Study the floor plan of Chartres and compare it with the plan of Ste. Foy from the previous section. What major differences do you notice in the design?

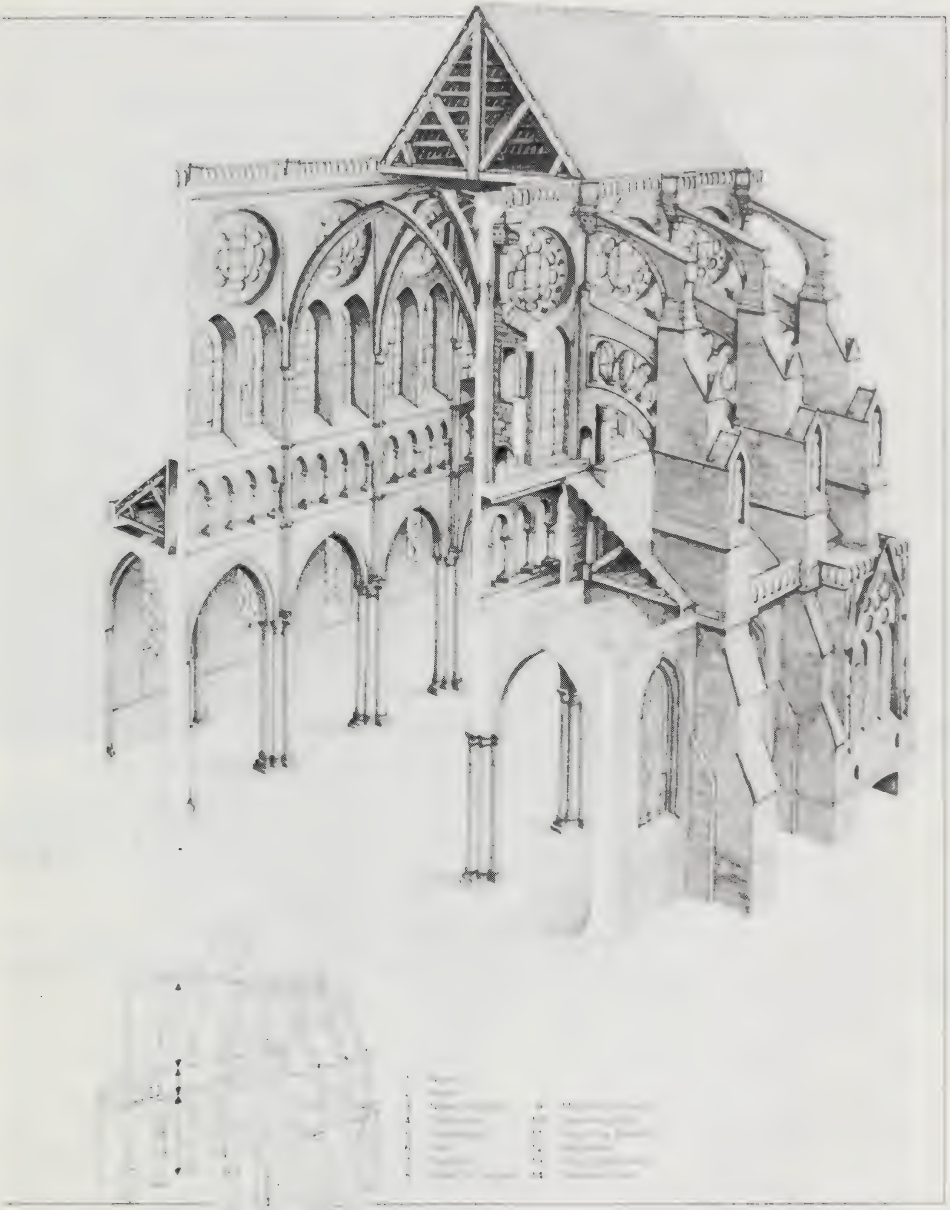

Illustration 250. Cut-away diagram, Chartres. Used by permission of Equinox (Oxford) Limited and first reproduced in *Introduction to Architecture* by Stephen Gardiner.

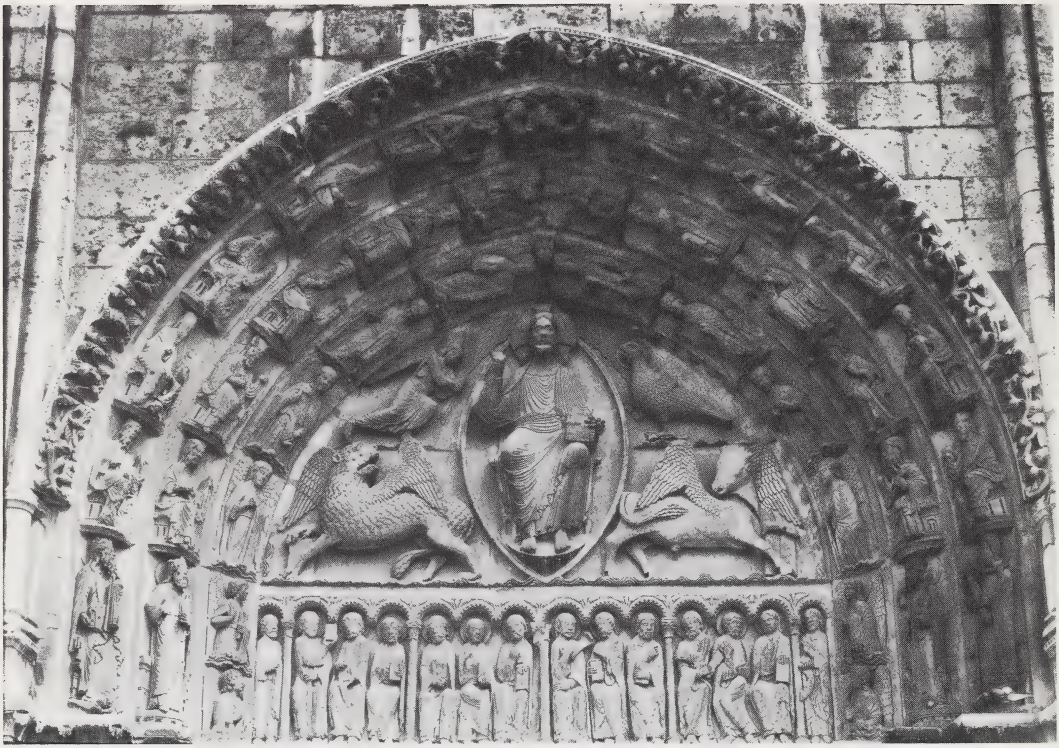

Illustration 251. Chartres Cathedral. West Facade. Royal Portal, c 1145. SCALA/ART Resource, N.Y. *Sightlines* 3891.

2. Look at the view of the front of the Chartres cathedral (Illustrations 248 and 251, pictures 188 and 189) and at the interior (Illustration 252, pictures 104, 105, 106). List at least five striking differences from the Romanesque church.

3. What changes in beliefs and function do these changes suggest? (See question 2.)

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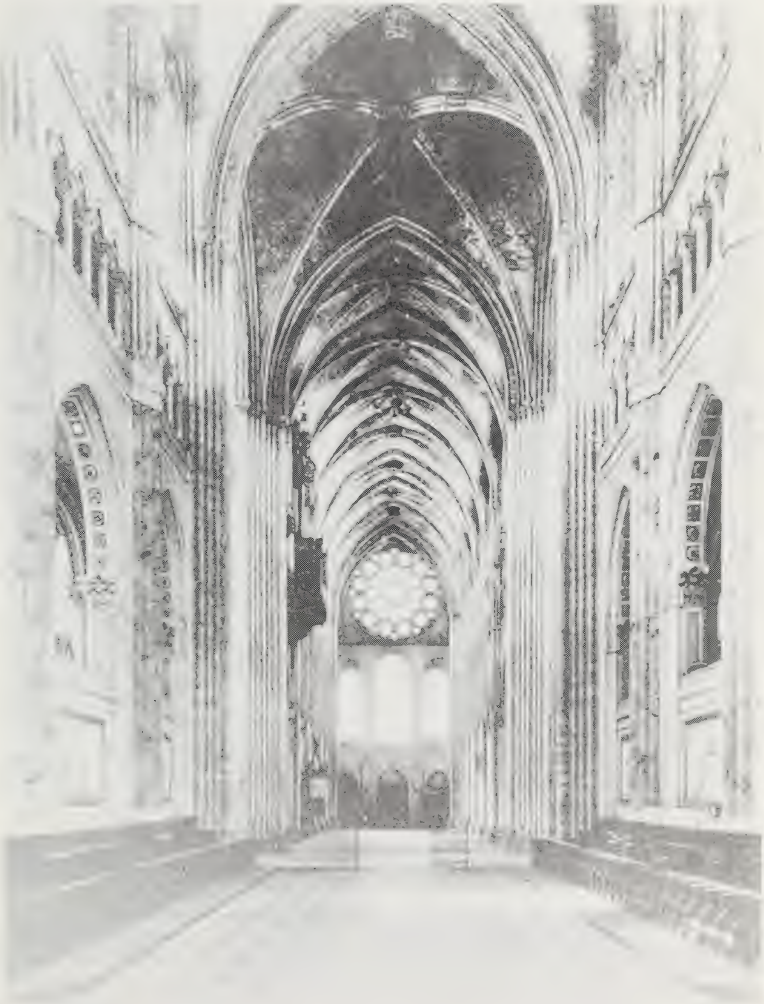

Illustration 252. Chartres Cathedral: view of the nave looking west, with the great rose window from the early thirteenth century. ART Resource, N.Y.

4. The Gothic cathedral, of which Chartres is an outstanding example, was intended to educate the people, to give them an idea of heaven, and to inspire them with spiritual longing. What is there about Chartres that you think might contribute to these aims?

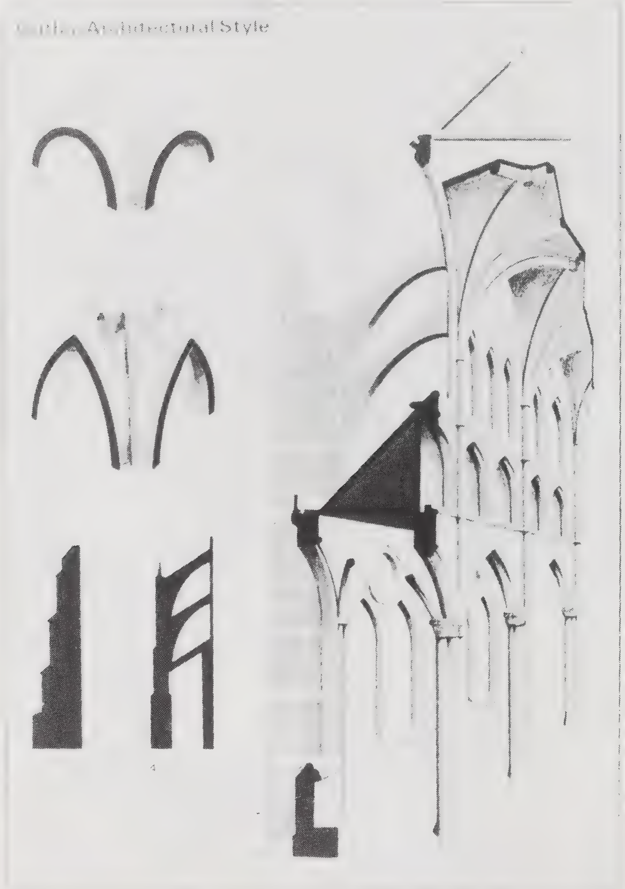

Illustration 253. Gothic Architectural Style. The diagram of Gothic architectural development shows: (1) barrel vaulting; (2) the development of the pointed arch and rib vaulting; (3) the stress taken by a buttress; (4) the Gothic development of the flying buttress; (5) a section of a Gothic cathedral to show buttresses supporting the roof and the thin tracery of windows and pillars. Reproduced from *Milestones of History, 100 Decisive Events in The History of Mankind.* Permission from W.W. Norton & Co. Inc.

You learned in the previous section that new materials and new technology can sometimes change not only the appearance of a building, but also its meaning. Study the diagram of Gothic Architectural Style, Illustration 253.

The barrel vault (1), the pointed arch (2), the buttress* (3), were all known before the Gothic period; the flying buttress (4) was a Gothic invention. These structures made it possible for the Gothic builders to make a skeleton of stone.

5. What effect would this structural system have on walls?

6. Although the vital principles of Gothic structure (pointed arch, buttress, ribbed vault) were known, they had not come together in one style. Spiro Kostof in *A History of Architecture: Settings and Rituals* remarks: "Technology needs a vision to become a style." Show that you understand what this statement means by applying it to Chartres. Think of what Chartres was meant to say to the people.

Check your answer(s) by turning to the Appendix, Section 4: Activity 2.

7. Some key Romanesque churches were built along the pilgrimage routes; Gothic churches were built in, or near, major cities. The Gothic church influenced both individual and social life in the town. How did the church serve the individual? How might the church have served social and economic needs?

8. Gothic cathedrals were special public buildings that expressed national pride. Rivalry among cities inspired the building of many Gothic cathedrals, and may have caused the later cathedrals to be built to spectacular heights. If you think of Chartres as a typical Gothic church, how might builders make significant variations in the design?

Check your answer(s) by turning to the Appendix, Section 4: Activity 2.

Activity 3: Stained Glass: Lessons in Colour and Light

Understand the connection between the symbolism of light and the building of the Gothic cathedral. Recognize the teaching function of stained glass windows.

Look again at the drawing of the Gothic architectural style and the images of the windows. The desire to make the cathedral a taste of heaven by filling it with coloured light like the light of precious gems, led the builders to design as many glass openings as possible. As these cathedrals became higher and higher, the opportunities for stained glass windows increased. It is also interesting to consider that climate may have influenced the style of windows.

In the south, the heat of summer would make large glass windows less desirable. In the north, where most of the great Gothic Cathedrals were located, this was not a problem.

Carved stone tracery (thin, branching stone strips) and iron rods were used to support the glass. These windows were carefully planned and the tracery constructed before the glass was inserted. Following is a sketch (Illustration 254) and a reproduction (Illustrations 255) of the west rose window at Chartres.

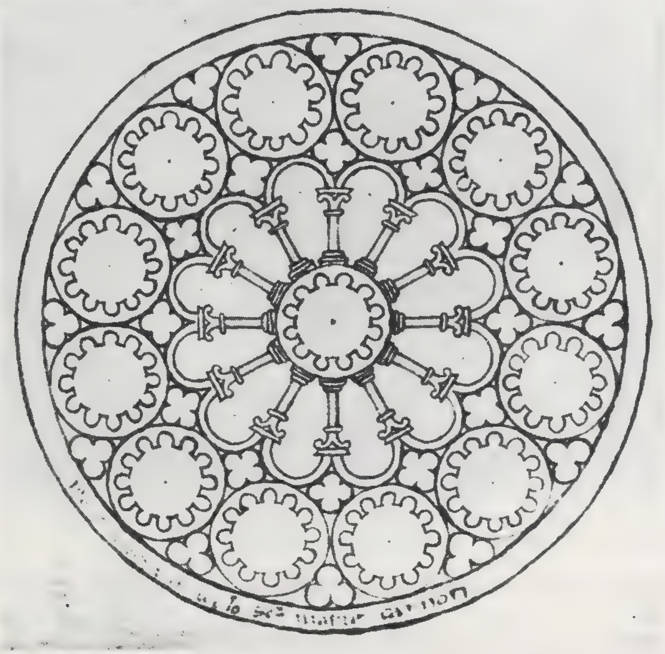

Illustration 254. Drawing of Rose Window, Chartres Cathedral. From *The Gothic Cathedral* by Wim Swaan. Drawing Bibliotheque National, Paris. Permission granted by Moira Johnston.

From the contemplation of the beauties of stained glass and from the reflection on its properties of transforming the effect of sunlight and glowing from within, the believer would be led to thoughts of God and of heaven, or so the builder hoped. In addition, the stained glass windows were a book of faith, filled with images of saints and of Bible stories.

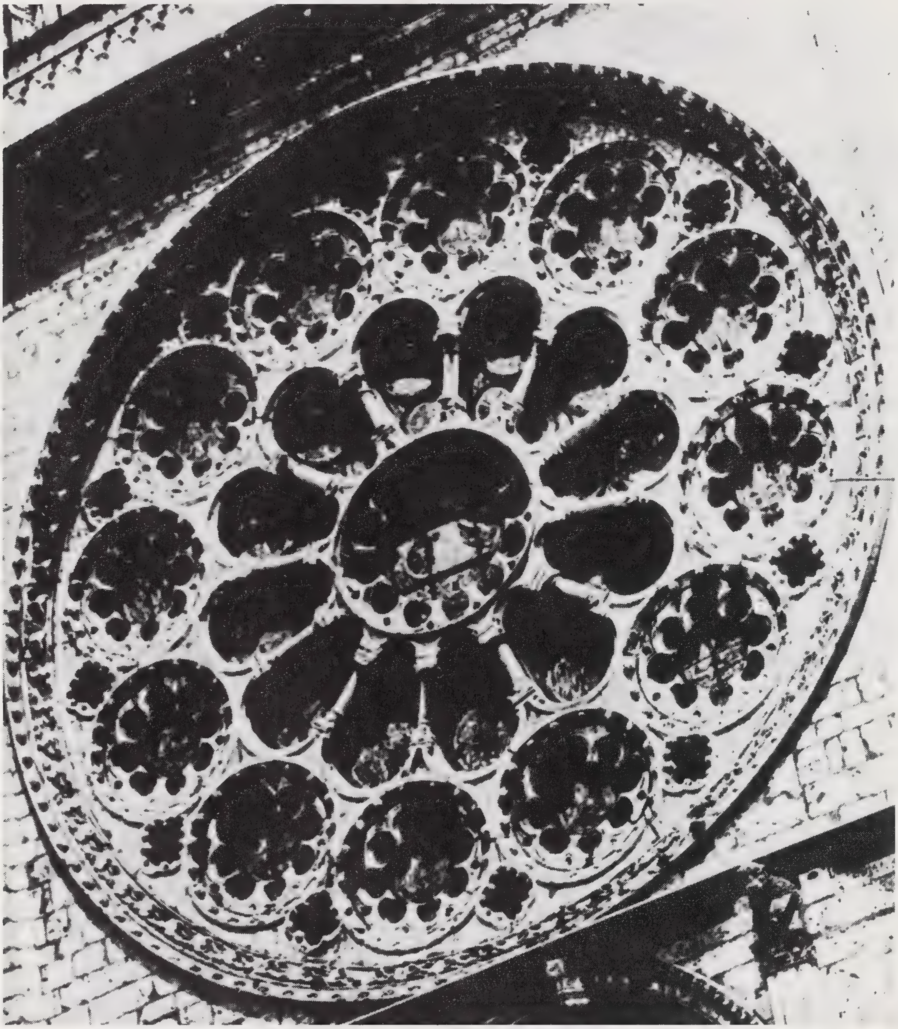

Illustration 255. West Rose Window, Chartres Cathedral. From *The Gothic Cathedral* by Wim Swaan. Photograph by Wim Swaan. Permission granted by Moira Johnston.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frames 6520 and 6521.

OR

Turn to pictures 190 and 191, Notre-Dame Cathedral, Chartres, in your *Art 21 Booklet of Reproductions*.

1. Why do you think these windows are called "rose windows"? Recall what you have learned about the medieval fondness for analogical thinking. Let your imagination guide you.

2. Compare the exterior and interior views of the rose window at Chartres. How might the change in effect be connected to the teaching goal of Chartres?

Check your answer(s) by turning to the Appendix, Section 4: Activity 3.

Following are some examples of stone tracery used in stained glass windows.

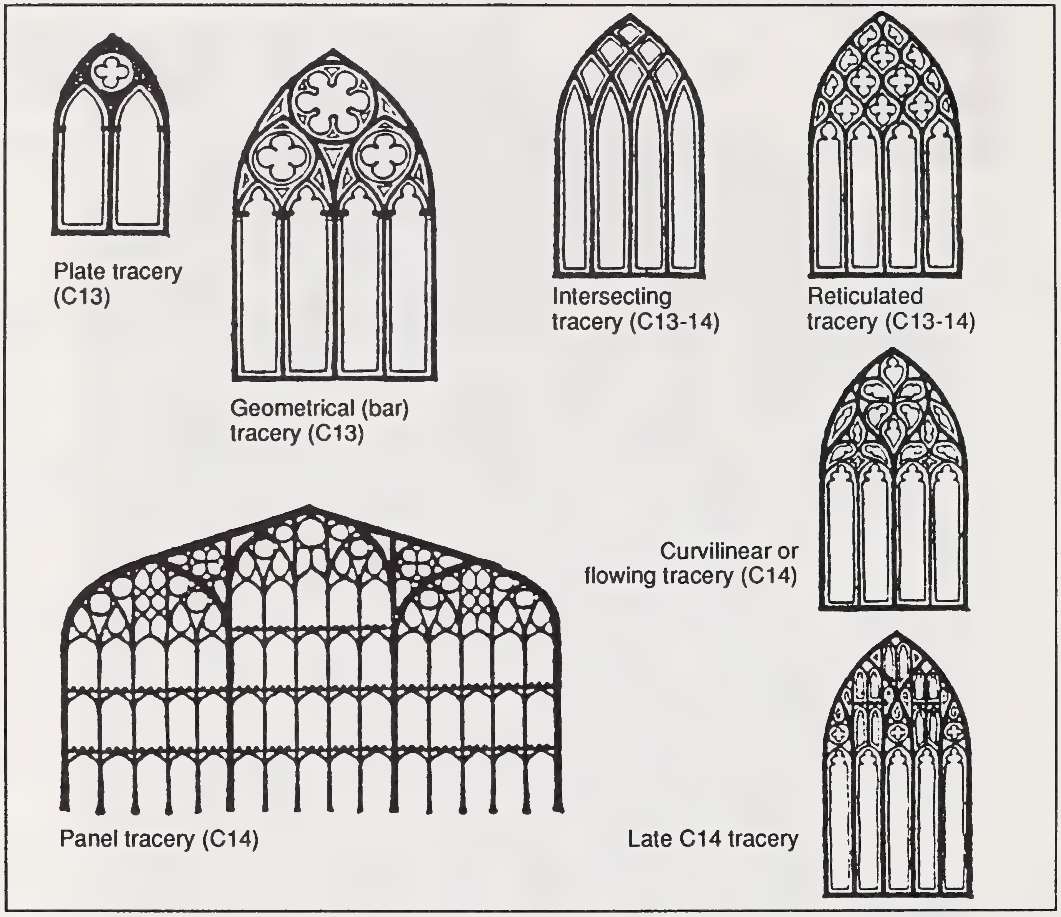

Plate tracery (C13)

Geometrical (bar) tracery (C13)

Intersecting tracery (C13-14)

Reticulated tracery (C13-14)

Curvilinear or flowing tracery (C14)

Panel tracery (C14)

Late C14 tracery

Illustration 256. 'Tracery' by David Etherton, from *The Penguin Dictionary of Architecture* by John Fleming, Hugh Honour, and Nikolaus Pevsner (Penguin Books, Third Edition, 1980), copyright (c) John Fleming, Hugh Honour, and Nikolaus Pevsner, 1966, 1972, 1980. Reproduced by permission of Penguin Books Ltd.

3. Select a tracery design that appeals to you and make a copy using pen and black ink or felt-pen. Make your tracery design large enough so that you have room to sketch. You are making a design for a stained glass window that you will donate to the school or civic centre as a memorial of your family. Select a significant family or personal event. Choose also some natural object that will symbolize a family characteristic. You might think of some plant, animal, or mineral that could stand for loyalty, or strength, or some special talent. Design the window. Remember to keep the shapes simple since the glass cutter will have to follow your design. Complete your design with colour.

Draw or Paste your image here.

Share your image with a partner.

Activity 4: The Guilds: Medieval Society at Work

Appreciate the structure and role of the medieval guilds.

To build a cathedral required the work of thousands. Some of the major trades needed were rough masons who cut, laid, and mortared* the heavy stone; "free" masons who carved the stone for the vaultings, the tracery, the sculptures; carpenters who built the arch frames, the furniture; glaziers for the glass work. In Chartres Cathedral there are 19 windows, each donated by a different craft guild. The medieval craft guild was the chief organization of skilled workers and artisans. Each particular trade had its own guild. Often the guild owned property, set membership requirements, wages, and standards of performance. You read about guilds in Module 2.

To be accepted into a guild a young person would complete apprenticeship,* then try for journeyman,* and finally master. An apprentice worked with a master, learning the skills and the trade secrets. The master was both guardian and teacher.

Once the apprentice demonstrated his skill in an "exam," he became a journeyman and travelled from shop to shop, working with masters for wages. After several years of experience, the journeyman presented his best work, his masterpiece, to a committee of masters. If the work was accepted, the journeyman then became a master and in turn could begin to train apprentices and to hire journeymen. A new master became a guild member. Often the new master received a guild ring and was expected to host a dinner to celebrate his successful elevation to the master's rank.

1. Explain how the guild system might benefit the practice of art.

2. If you were a medieval master glazier examining the masterpiece of a journeyman stained-glass artist, what five things might you look for as evidence of skill?

3. While the guild system maintained high craft standards, explain why the system may have delayed innovation and new technology.

4. Sometimes the modern trade union is connected to the medieval craft guild. Can you think of some similarities? What might be the major differences?

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5. Suppose the educational system were organized so that the students were apprentices and the teachers, the masters in a scholar's guild. Invent a role for a journeyman scholar. What could such a scholar's masterpiece be?

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Check your answer(s) by turning to the Appendix, Section 4: Activity 4.

Follow-Up Activities

If you had difficulty understanding the concepts in the activities of this section, it is recommended that you do the Extra Help. If you have a clear understanding of the concepts it is recommended that you do the Enrichment.

Extra Help: Review

1. Review this section and complete the following paragraph.

We usually think of ____________________ as the founder of the Gothic style of architecture. Gothic architecture symbolizes ____________________. A Gothic Cathedral was intended to remind the worshippers of Bible stories by ____. The opening up of the walls by the use of three structural devices – ____________________, ____________________, and ____________________ – allowed designers to increase greatly the number of ______________________________. Private donors gave many of these to the cathedral. At Chartres at least nineteen were contributed by ____________________.

2. Design a badge for a guild of scholars. Use pen and black ink or coloured pencils. The badge is to be worn on the front of a cap.

Draw or paste your image here.

Check your answer(s) by turning to the Appendix, Section 4: Extra Help.

Enrichment: Designing a Tympanum

The entrance to a great Gothic cathedral was intended to be a symbol of the entrance into heaven.

You Choose

If you have access to the laserdisc *Sightlines*, find and view frame 3851.

OR

Turn to picture 193, Notre-Dame Cathedral, Chartres, the Royal Portal, in your *Art 21 Booklet of Reproductions*.

Also view picture 194, Notre-Dame Cathedral, Chartres. Tympanum, *Christ Surrounded by the Symbols of the Four Evangelists*, in your *Art 21 Booklet of Reproductions* and answer the following questions.

The tympanum is the area above the lintel and below the arch over the cathedral door. This area was like a great "screen" on which the sculptor could organize and carve in stone the symbols and figures. On the Royal Portal of Chartres is the figure of Christ in majesty.

Below him are the apostles and further down are figures from the Old Testament and kings and queens of France. The twenty-four elders witness the return of Christ. Christ is shown as a wise judge.

The tympanum was an ideal space – like a billboard – for educating people through symbolic images. These images illustrated some of the religious beliefs of Christians and symbolized the function of the Cathedral.

1. How does the sculpture program meet the educational purposes of the church?

2. Design a personal tympanum that if carved or sculpted over the doorway to your home would communicate through symbols something about your ideals. Outline a large shape, similar to the Chartres tympanum. Select a significant event from your experience that would make a suitable subject for your drawing. Describe or draw your plan so that a sculptor could complete it to your satisfaction.

Draw or paste your image here.

Share your image with a partner.

Conclusion

In this section you learned something about the meaning of Chartres as an example of a Gothic Cathedral. You learned of its importance to the community and its power to shape Christendom by educating the people through the power of its symbols: light, stained glass, and sculpture.

The Gothic church employed thousands of skilled workers in its construction. These skilled workers were organized in the trade guilds which preserved the crafts and standards of work for hundreds of years.

Module Summary

In this module you have learned that public architecture represents a society's values, and the values of the powerful and important people in that society. Buildings are not only significant for their function, but also for the way they "present" themselves to the viewer.

The goal of the architect is to work with existing technology and materials to project the desired image yet ensure that the function of the building is maintained.

Assignment Booklet

Turn to your Assignment Booklet and do the assignment(s) for this section.

Appendix

Activities

Follow-Up Activities

Glossary

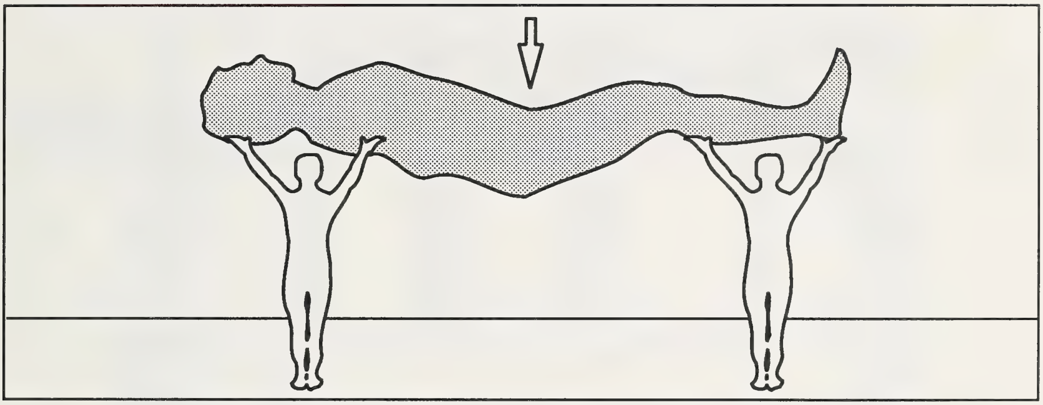
Glossary

Abbey	a monastery under the supervision of an abbot; the group of buildings that makes up such a monastery
Analogical	a work expressing a comparison between similar features of two things (analogy), e.g., the analogy between light and a brilliant mind
Apprenticeship	the arrangement whereby one person works for another in order to learn a skill, a craft, a trade
Aqueduct	a structure which carries a canal for water across a valley or over a river
Balloon-frame	a wooden building frame composed of machine-sawed pieces fastened with nails and with upright studs and crosspieces holding the frame together
Bays	any number of similar vertical divisions of a large wall or space A division of interior space.
Boisterous	rough and noisy
Buttress	an external support built to steady a structure In Gothic cathedrals the buttress was built into or against the outside stone wall.
Cohesion	the state of being or sticking together
Devotion	serious attachment or dedication to a cause, a person, an idea; often used to describe a willingness to serve God or religious ideals
Emblem	a sign or design or figure that identifies or represents something, e.g., the emblem of a school
Entablature	the part of an ancient temple that is between the top of the columns and the eaves of the roof
Intervention	interfering in the affairs of another, a going-between to influence actions
Journeyman	a person who has completed apprenticeship at a trade or craft and now can work for another for wages
Masonry	work constructed by a stone-worker The word usually refers to stonework.

Megaliths	• see Glossary, Module 4
Millennium	• a period of 1 000 years
Monasteries	• see Glossary, Module 2
Monastic	• characteristic of the way of life of monks (men who have taken religious vows and who live in monasteries)
Mortared	• bonded together by a mixture of lime and cement; a way of joining stones or bricks in building
Ornate	• elaborately decorated
Patron deities	• gods of the ancient world who were thought to take a special interest in and to exercise influence over an individual or a city or state
Piers	• large square pillars for supporting walls, arches, domes
Pilgrimages	• long journeys made to some sacred place as an act of devotion; any long journey undertaken to pay homage
Plunder	• to rob people of goods or valuables by force; taking by force as in war
Precedent	• a prior event or case which may serve as an example or model for similar cases
Relic	• part of a dead holy person's body or belongings kept as a memorial; a souvenir
Romanesque	• a style of architecture in western or southern Europe from the ninth through the twelfth century Characteristics: round arch, groin vault, barrel vault, heavy stone construction, narrow openings
Sarsen	• large sandstone blocks found in south central England; sometimes called Druid stones
Sheathed	• covered with a protective layer or casing
Stadia	• a plural for stadium, a sports arena (Also was a Greek unit of length, about 607 feet.)
Transition	• movement or change from one position, or stage, or state to another; e.g., the transition from an autocracy to a republic
Venerate	• to treat with reverence, with awe, with deep respect

Section 1: Activity 1

1.



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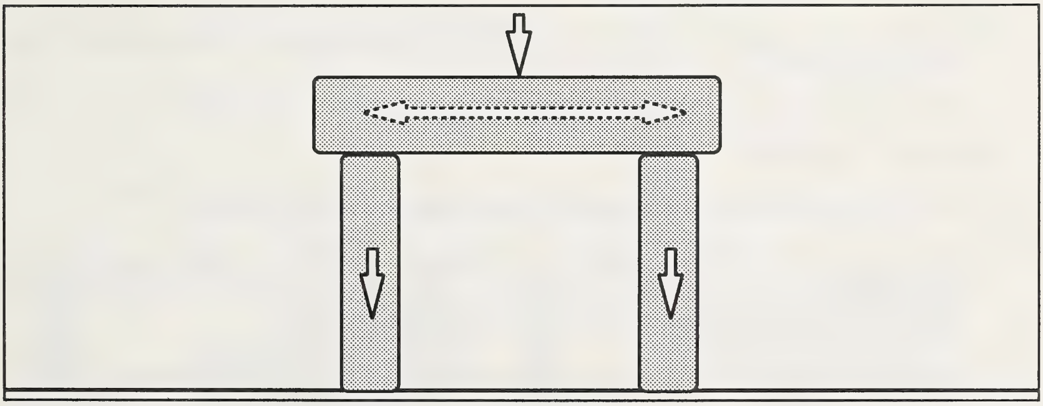

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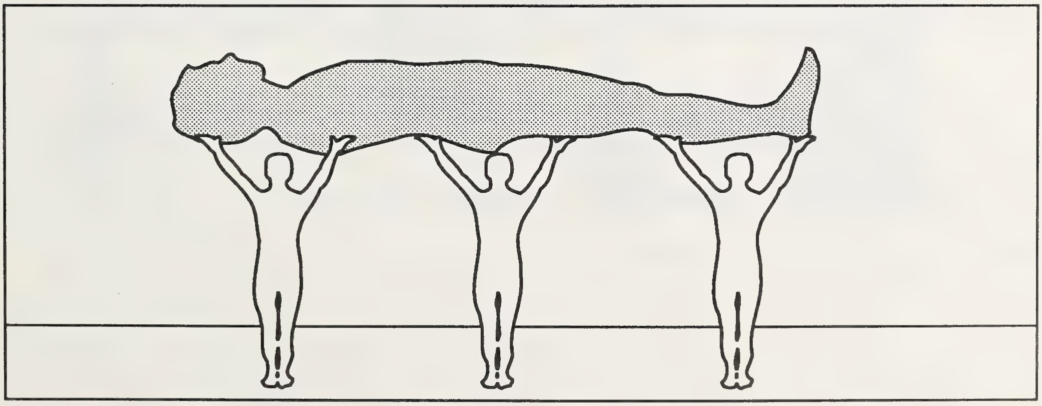

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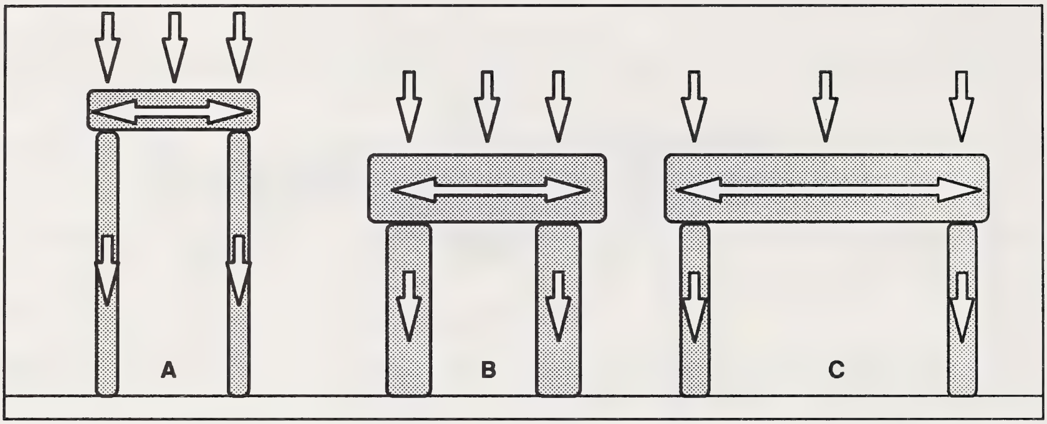


5. B seems more stable. The weight is better supported by the heavier posts. There is less tension because the span covered is smaller.

6. C seems most unstable. The lintel is too heavy for the slender posts. The cross-space is too wide for the tension.

Section 1: Activity 2

1. The circle would have had to be dug out, the placement of the posts marked.

2. The structure is planned in an orderly way. The relationship of size has been considered, the arrangement of posts and lintels has unity, the posts have been tapered. The arrangement of the large stones allows the journey of the sun to be marked.

3. Answers will vary. The visual effect of Stonehenge is mysterious and overpowering. (Other words you might use are massive, impressive, colossal, majestic, powerful.)

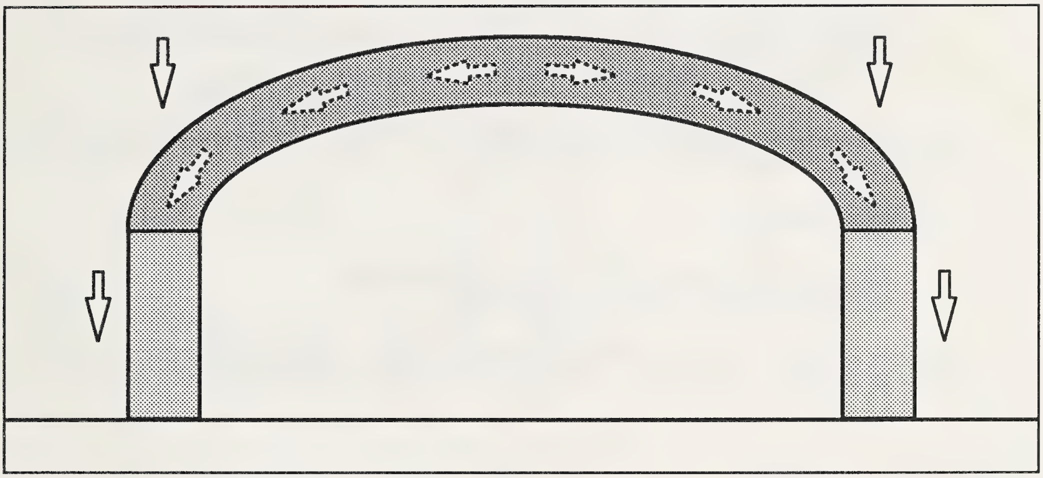
4. a. The writer offers the evidence of the design of the stone circle to conclude that the people toiled together to set up the megaliths and that there must have been a plan for a community ritual.

   b. Kostof called Stonehenge "public architecture" because it is a setting for a special community ritual that makes of each user a "larger person than he or she is in daily life."

5. Answers will vary. A common post and lintel design is a doorway.

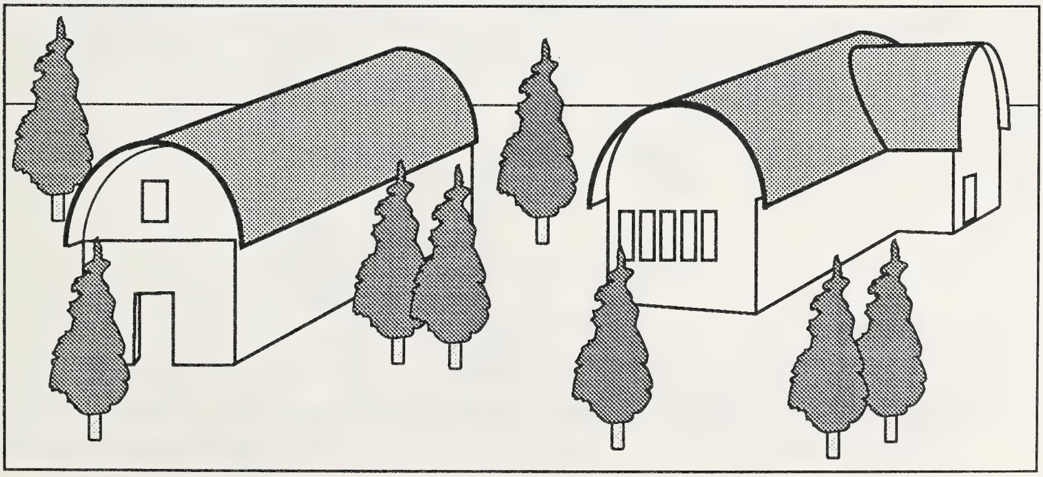
Section 1: Activity 3

1\.



2. a. You can make at least 5 variations of roof designs from the barrel vault. Two are shown here.

b\. Answers will vary.



Section 1: Activity 4

1. The forces to be considered before the Pont du Gard was built are
    - the distance to be crossed
    - the tension between the supporting posts
    - the weight or force of gravity pressing down on the posts and arches

2. The greatest force will press against the widest arch. The greatest support will be in the massive piers along the bottom row.

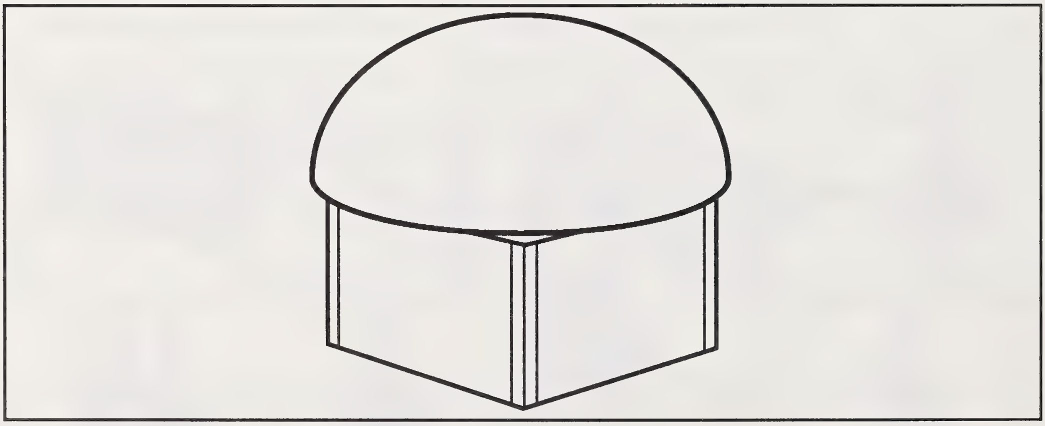
3. The design elements are
    - along the top: a visual rhythm of small repeated arches
    - middle and bottom: a rhythm of large arches

    The arches vary in thickness creating variety in the design. Horizontal directions are emphasized by stone edges.

Section 1: Activity 5

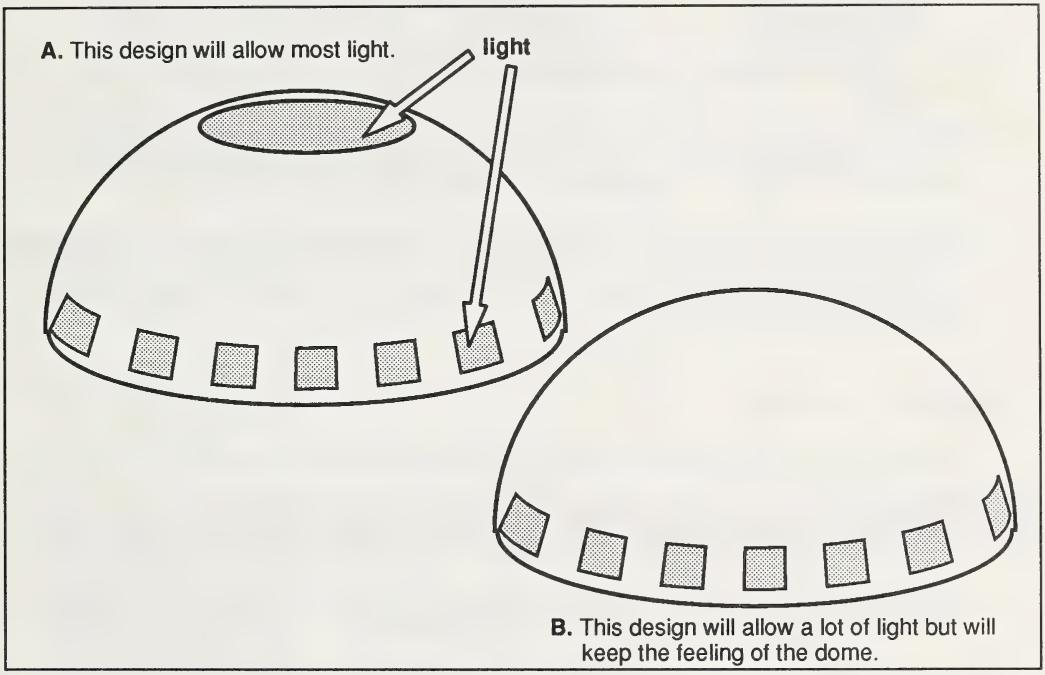
1. The size of the rectangular opening has to be planned so that the circumference of the "dome" will rest upon it. You have to measure the "dome" first.

2.



3. These corners would appear unfinished from inside and from the outside. Solutions to the corner problems will vary.

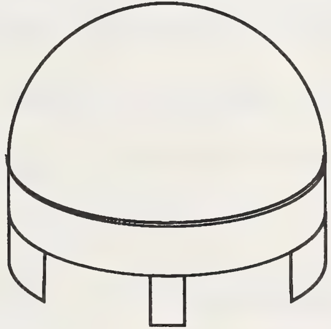
4. You could place openings at the top of the dome, at the bottom, or both. The following are examples.



A. This design will allow most light.

B. This design will allow a lot of light but will keep the feeling of the dome.

5. Answers will vary; you could curve the supporting posts and beams.



Section 1: Activity 6

1. Post and lintel, arch, dome, wall piers, and barrel vaults can be identified.

2. The dome is supported by massive walls.

3. The following are possible details:

- coffered ceiling
- patterned floor
- Corinthian columns
- niches with vaults
- arcade
- windows with pediments
- stepped dome
- opening at top of dome
- massive walls

4. The architect broke the space by horizontal bands and windows. Inside, the first wall has a ground floor with niches and recesses, the second story is broken by windows.

5. The high dome with light coming through the single opening at the top might symbolize heaven. The ground story with niches and recesses and open area could be a place to hold court. The different niches with different statues and the wall rising to the dome could suggest the connection between heaven and earth.

Section 1: Activity 7

1. Two major new concepts would be the use of a steel skeleton and the notion of great height.

2. The tower was not a building, nor was it solid, nor did it have a covering. The tower was like a great bridge set upright. What was novel was the bare skeleton.

3. This changing view could cause artists to look upon stretches of landscape as flat abstract patterns, it could also increase the awareness of distance.

4.

	ADVANTAGE	DISADVANTAGE
WOOD	• readily available can be cut into large planks or sheets	• decays if not treated
BRICK	• attractive, not too difficult to obtain, durable	• needs to be mortared • heavy
GLASS	• attractive, allows walls to open up, permits the passage of light	• can be easily broken • hot in summer • cold in winter unless specially treated
STONE	• durable, solid, attractive	• difficult to obtain, costly

5. The following are possibilities:

    - wooden frame with stucco covering
    - wooden frame with vinyl siding
    - wooden frame with cedar covering
    - steel frame with stone, or brick, or glass, or combinations of these

6. Steel frame buildings are like cages, a steel cage can support the entire weight of a building so the buildings can rise to great heights.

Section 1: Follow-Up Activities

Extra Help

1. a. Post and lintel
   b. Arch and vault
   c. Skeleton and skin
   d. Dome and pier

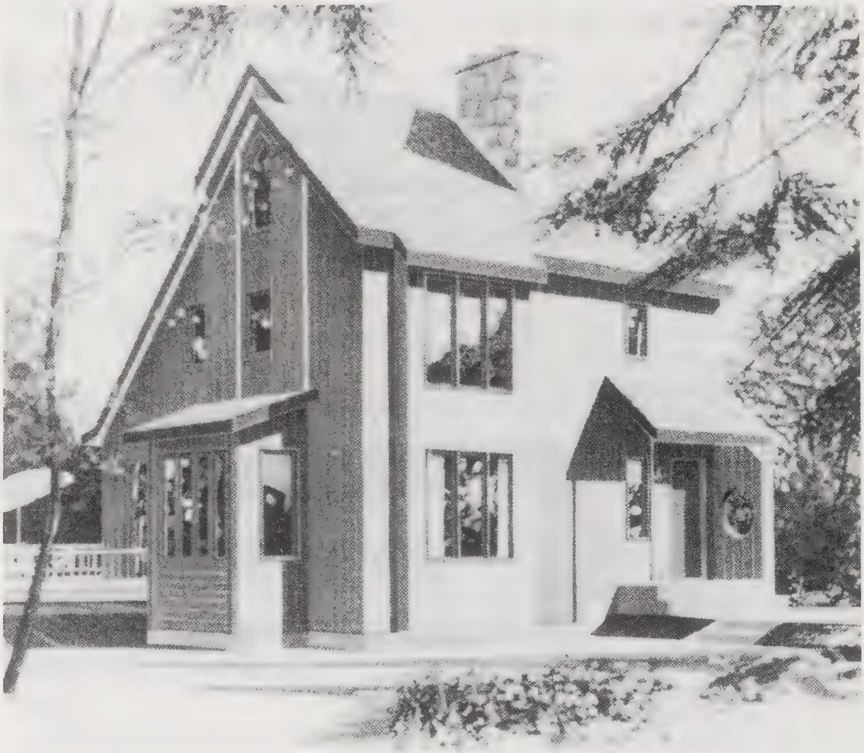
2.

STRUCTURES	POSSIBLE MEANINGS
POST AND LINTEL	• permanence, solidity, stability
ARCH AND VAULT	• power, stability, permanence, grace
DOME	• mystery, "heavenly" space, universe
STEEL FRAME	• efficiency, strength, grace

Enrichment

The following information is supplied along with the architect's floor plans:

Plan #1



W-744
Natural Splendor
Style: Recreated modern design
Layout: Featured on the main floor of this semi-open design is a sunken living room with a fireplace. Adjacent is the dining and kitchen area with sliding glass doors. Upstairs are two bedrooms and a luxury bathroom with whirlpool bath and shower stall. The third floor functions as a family room or extra bedroom.
Living space: 1,818.66 square feet
Special features: A sheltered front porch and wood with stone or brick exterior complement the outward appearance.[1]

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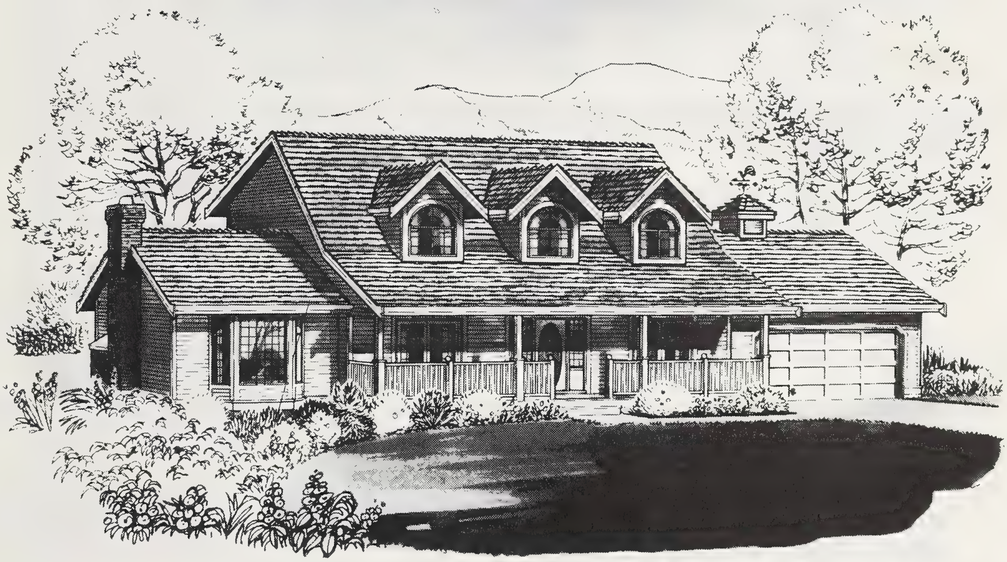
[1] Used with permission of *Select Homes and Food*, February 1989. Architect Renée Cayer of Les Dessins Drummond Inc.

Plan #2.



J6-3-295
Country Living
Style: Traditional split-level
Layout: The formal living and dining rooms open onto a covered front veranda through French doors. A step up from the spacious family room is the kitchen and breakfast nook, laundry room and three-piece bathroom. An open stairwell leads to three bedrooms on the second floor, one being the large master bedroom with a walk-in closet and three-piece ensuite.
Living space: 2,037 square feet
Special features: Three dormers with round-top windows give this traditionally styled home a touch of elegance.[1]

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[1] Used with permission of *Select Homes and Food*, February 1989 and architect Al Goertzen of Jenish House Design Ltd., New Westminster, B.C.

Section 2: Activity 1

1. The Acropolis hill overlooked all of Athens so that every citizen would be able to see the shrines. The Acropolis, as the highest hill, would symbolize the power of the gods.

2. Post and lintel

3. The designers have added figures to the pediment, relief sculptures to the frieze, and some decoration to the columns.

4. The figures tell us that the Parthenon must be at least 18 metres high and 34 metres wide. Humans would feel small in such an immense space (the Parthenon was 72 metres long, 34 metres wide and 18 metres high).

5. Answers will vary. Some sensations might be eagerness, curiosity, awe, fear, excitement. Thoughts might be related to honouring the goddess, taking part in a ritual, being part of a community.

6. The sculptures in the pediment and the relief figures in the frieze tell the story of Athens' history and the stories of the gods.

7. The Parthenon stands on a hill overlooking the city. As a symbol of the greatness of Athens, the Parthenon would always be visible. Also, the Parthenon was a beautiful but not extravagant temple. (Other answers are acceptable).

Section 2: Activity 2

1. The columns are fluted (that is, carved with grooves from top to bottom), tapered, capped with a swelling outward and flat block.

2.

	DORIC	IONIC	CORINTHIAN
BASE	• rests on the ground	• has a two-section base	• base rises in three layers
SHAFT	• tapers from bottom to top, wide grooves	• straight from top to bottom	• straight from top to bottom, slender
CAPITAL	• plain, swells outward in two layers	• a double curve, one at either side	• decorative leaf design
ENTABLATURE: ARCHITRAVE	• plain wide block	• narrow three-layered block topped with "bead" moulding	• narrow three-layered block with plain molding
FRIEZE	• a plain band alternating with a patterned block	• a plain band	• a plain band

3. a. The Doric order has the effect of greatest stability.

   b. The large shaft resting directly on the ground and the wider part at the bottom suggest stability.

   c. The Corinthian order seems lightest and most decorative.

   d. The slender straight shaft, the delicate carved leaf decoration on the capital express a lightness.

4. By adding a Greek order to a modern building architects might hope to give the building a classical appearance, to connect the building with history, to add to its grandeur. (You may think of other connections).

5. This subject encouraged the Athenians to reflect on their history, it reminded them that their city was under the protection of the goddess, Athena, and that the source of their wealth was a gift from the goddess.

6. Answers will vary. The addition of colour would have made the Parthenon brilliant, and exciting. The figures may have been more easily read.

7. You may argue on either side. In your argument refer to the information you gained from this section. You will say, "restore," if you want to see the Parthenon as it was. You may think that wouldn't be possible, so you'll say, "Don't restore. Keep its history as we see it."

Section 2: Activity 3

1. The Medici Palace, roughly 45 metres × 45 metres and almost 30 metres high is massive compared with private two-story homes today which stand about 6 metres high and are roughly 10 metres × 39 metres.

2. The design seems more like an office building. There is no "front yard." The massive size, the numbers of rooms, the arrangement of rooms, the interior courtyard are all unlike a modern city home.

3. Power, stability, conservative style, security are all possible answers.

4. a. The location is on the corner of three main streets.

   b. Ten properties had to be eliminated. The other leaders of the city allowed the Medici to alter this city block perhaps because they respected Medici power and also because they valued great houses. Such a residence would make their city seem wealthy and important.

   c. The difference would be because a Greek city was interpreted as a creation of the gods and a citizen's chief duty was to honour the gods. In Renaissance Florence the city was the base of power for wealthy men. The change in buildings symbolizes these different beliefs.

   d. The massive size, the almost square shape, the great stone walls, the heavy overhanging top all suggest permanence, stability, and strength.

5. You will first have to invent a name for yourself in order to set your argument up in dialogue format.

   All scripts will vary. Be sure to structure your argument using information you learned from this section, but don't be afraid to use "present day" as a point of reference.

Section 2: Activity 4

1. The Wainwright Building is a steel skeleton with a stone "skin" that was broken by many windows keeping the covering light. This was the first tall building that seemed light and open.

2.

DIFFERENCES	SIMILARITIES
• height • thickness of walls • numbers of windows • marking off of stories	• use of stone • overhanging design of the top

3. a. Sullivan made the sheathing or covering of the building light echoing the steel framing underneath.

   b. Architects wanted to reflect traditional forms and make the "construction seem reliably sturdy." They wanted bigness to go with heaviness as tradition showed.

   c. The great height and the open light window walls are modern.

   d. No. Buildings today are sleek and smooth. Usually modern office buildings are covered with glass and have very little decoration.

   e. The major advantage is that the walls do not have to support weight and so can be light and open.

4. a. Answers will vary. You should refer to the special qualities mentioned in the description.

   b. Answers will vary.

   c. Sketches will vary but should show the special qualities of unusual shaping, lightness, strength.

5. Possible questions might be

   - How much will this building cost?
   - How deep should the foundation be?
   - Can you design two stories?
   - What will the outside look like?
   - What roof material will you use?

6. Some possible questions the architect will ask might be

   - How many rooms do you want?
   - What will be the most important room of your house?
   - In which direction do you want your house to face?
   - What functions will this house serve?
   - How many people will live there? (You will think of many more).

7. Three questions the mayor or your neighbour might ask are

   - How big will this house be?
   - What will the outside look like?
   - Will this structure be safe? (You will think of many more).

Section 2: Activity 5

1. The city was willing to take some chances, or wanted something different, or was looking for a modern exciting design rather than a traditional one.

2. Reinforced concrete is an ideal choice because it can be moulded into exciting shapes and it is strong and durable.

3. The roof design suggests sails which suggests in turn an association with the sea.

4. Five unusual designs might be

    - the roof shapes
    - the irregular roof line
    - the changing heights of the walls
    - the windows in bands
    - the sloping entrance way (You may notice some others.)

5. Answers will vary depending on your reaction to the Sydney Opera House.

6. The building is like a great sculpture that adds interest to the city. The Opera House gives the people an unusual gathering place for operas, concerts, and other functions.

Section 2: Follow-Up Activities

Extra Help

Your drawings should reflect the descriptions given. Examples will vary.

- Pediment: the triangular part of a building above the horizontal element of an order

- Doric Order: a design for a Greek column; Doric order is plain

- Cornice: the crowning or projecting part of a building that rests on the last horizontal element

- Skeleton and Skin Construction: Wainwright Building

- Architrave: the lowest section of the entablature; the horizontal beam or lintel

Enrichment

Answers will vary.

Section 3: Activity 1

1. Santiago de Compostela is the final destination.

2. Paris, Vézelay, Le Puy, or Arles are possible starting points.

3. Paris, Orleans, Tours, Bordeaux, Burgos, Leon, and finally Santiago de Compostela.

4. Moissac is a “connecting” point.

5. The villages would have many inns, hostels, and other business as a result of this trade.

6. The pilgrims would need food, shelter, clothing, souvenirs, horse shoes, food for horses, water, medicine, etc.

7. The towns and villages would prosper. They would have flourishing businesses.

8. These relics would be valuable because they would be so rare. They would also be valuable because having a relic would bring many pilgrims to the church.

9. A wealthy Christian might make a donation of money. A poor person might stay in the village a few days and offer free labour or service.

Section 3: Activity 2

1. The building would have to be large enough for pilgrims to gather. The building would also have to have walkways around the outside so that pilgrims could visit the relics.

2. It was the first major stop for those who started from Le Puy. Also it was half-way between Le Puy and the mountains.

3. The large size, the multiple walkways, the many chapels would be essential features.

4. Some of the advantages of stone are it is solid, durable, and strong.

5. Height and stability are achieved by piers and barrel vaults or rounded arches.

6. The columns are not fluted (no grooves), the columns are attached to the piers, the capitals have a different leaf design. Some capitals in the top story have carved figures on them.

7. The major differences between the pilgrimage church and the Christian church is in size and in the number of chapels. The early Christian church has no transept and no walkway around the chancel.

8. The walls seem light because the heavy supports are on the outside and the walls are broken up by chapels and windows. The church would be lighted by some daylight and by candlelight and oil lamp.

9. The church perhaps reminds the people of their journey to heaven. They enter and move through the space towards the East where the sun rises. The plan of the church would encourage the people to visit the shrine. The cross shape might remind them of the Crucifixion.

Section 3: Follow-Up Activity

Although "pictures" will vary, you should have described specific images and meanings from the information contained in this module.

Section 4: Activity 1

1.

	CHARACTERISTICS	POSSIBLE SYMBOL
FIRE	heat, light	war, love, power, energy
WATER	wet, flowing, life-giving	life, new life, change, growth
ROCK	hard, solid, unmoving, durable	strength, permanence, stability
MOON	far away, changing, pale light, orbits earth	change, fickleness, something remote
DANDELION	growth, bright yellow colour, grows almost everywhere, seeds carried by wind	commonness, perseverance

You will be able to think of other answers.

2. a. The loveliness of many-coloured gems are the natural objects that inspired the Abbot to think of heavenly things.

   b. The Abbot was able to transfer the properties of the material things to "that which is immaterial." Natural objects act as symbols for the spirit world.

3. The Abbot believed that rich colours, light, gold, and gems would help the worshippers reflect on sacred virtues and on the "higher world."

Section 4: Activity 2

1. Chartres is wider and much longer. There is a double row of piers and columns around the northeast or chancel end. There are three entrances. The transept cuts across the middle of the nave. Buttresses are larger and there are more of them.

2. Five striking differences include

    - the large round "rose" window at the end
    - the pointed arches
    - the extra row of windows at the top
    - the wider nave and greater height
    - the more decorative columns

3. These changes suggest that the church had become a symbol for heaven. The great height meant more windows and more light. There seems a greater emphasis on decoration suggesting that the church might also be like a civic centre.

4. The coloured windows depicted scripture stories. The great height might suggest a heaven. The bright colours, lights, and decorations might remind them of the pleasures of heaven and so fill them with spiritual longing. The sculptures in the facades (over the doors) depicted scripture stories.

5. This structural system would take some of the weight off the walls. The walls could then be opened up to allow more light to enter the church.

6. The vision of a church as a rich and colourful symbol of heaven required a design of a building that would have great height, soaring roofs, many windows of stained glass. The church would have a feeling of openness and richness. The means of doing this was the technology of pointed arch, buttress, ribbed vault, so the planner of Chartres put the technology to work to realize his vision.

7. The church served the individual by attending to spiritual needs. The church was a place of worship. In addition, the church was not only a major gathering place for people serving social needs, but would also provide work for many people, thus satisfying economic needs.

8. The builders could try to make the building higher, could make the columns simpler, could try for larger windows, could vary the decoration and the sculptures.

Section 4: Activity 3

1. These windows were symbols of the sun and of the rose. You may not have known that the rose was the symbol for Mary, Christ's mother, who was sometimes called "rose without thorns." You will have some other ideas.

2. Outside, the stone design has emphasis. No light or colour is visible. Inside, the stone design becomes a dark line and the brilliant light and colour is emphasized. This change could symbolize moving from earth to heaven.

3. Designs will vary. Check against the tracery models.

Section 4: Activity 4

1. The guild system might benefit the practice of art by maintaining high standards for work, and by so training the artists the guilds would keep the skills alive.

2. Answers will vary. You might have the following:

   - strong design
   - suitable symbols
   - skill at cutting glass
   - choice of colours
   - skill at joining the glass pieces

3. The masters decided who would be admitted to the mastery level. They would probably set standards by what they already know, so might not agree on the worth of new techniques and new ideas.

4. A modern trade union has standards for admission and controls many of the jobs. The major difference might be that the modern trade union does not operate the school and its members do not wear distinctive dress.

5. Answers will vary. The key word is **scholar**, which means someone who enjoys study and learning.

Section 4: Follow-Up Activities

Extra Help

1. We usually think of ***Abbot Suger*** as the founder of the Gothic style of architecture. Gothic architecture symbolizes ***heaven***. A Gothic Cathedral was intended to remind the worshippers of Bible stories by ***stories in the stained glass windows and sculptures***. The opening up of the walls by the use of three structural devices – ***barrel vaulting***, ***pointed arch***, and ***flying buttress*** – allowed designers to increase greatly the number of ***stained glass windows***. Private donors gave many of these to the cathedral. At Chartres at least nineteen were contributed by ***different craft guilds***.

2. Designs will vary. Think of the badges that your school awards; Girl Guides, Scouts, and teams have badges. Remember to use symbols that would relate to scholars and scholarship.

Enrichment

1. The sculptures show the Christ figure surrounded by four large animal forms. Below Christ are the figures from scripture. Around the arch are angels, kings and queens, and scripture figures. A medieval person who knew what these symbols meant could read a message in the design and so learn more about his or her faith.

2. Answers and designs will vary.

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